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JANUARY 1908



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICS AND LICHENS

EDITOR
ANNIE MORRILL SMITH

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THE SULLIVANT MOSS CHAPTER

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MRS ANNIE MORRILL SMITH

ASSISTED BY

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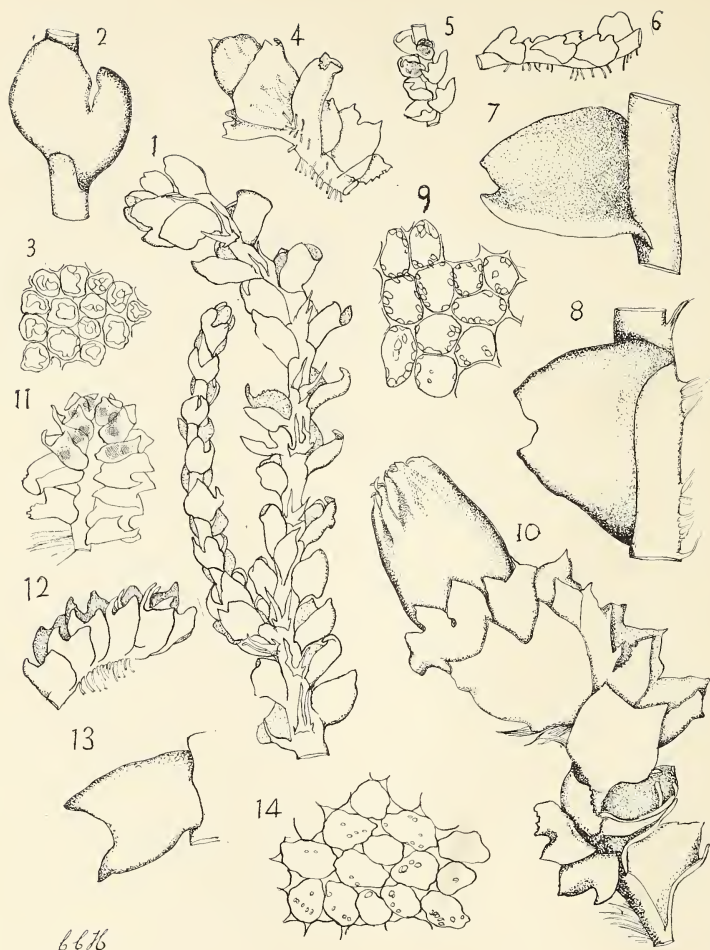


PLATE I.

Figs. 1-3. *Lophozia Kunzeana* 1—Plant, showing underleaves and innovations $\times 22$. 2—Leaf, dorsal view $\times 70$. 3—Leaf cells $\times 365$.

Figs. 4-9 *Lophozia Muelleri*. 4—Plant, showing perianth $\times 22$. 5—Male plant, dorsal view $\times 22$. 6—Plant $\times 22$. 7—Leaf, dorsal view $\times 70$. 8—Leaf, ventral view $\times 70$. 9—Leaf cells $\times 365$.

Figs. 10-14 *Lophozia porphyroleuca* 10—Plant, showing perianth $\times 22$. 11—Male plant, dorsal view $\times 22$. 12—Plant $\times 22$. 13—Leaf, dorsal view $\times 70$. 14—Leaf cells $\times 365$. All reduced one-half.

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No. 1

TEN LOPHOZIAS III.

From "Notes on New England Hepaticae."

DR. A. W. EVANS IN RHODORA.

Selected and Illustrated by Caroline Coventry Haynes.
[By permission.]

These Lophozias have been illustrated in various publications, but for two reasons I have figured them again: for the student as a handy reference, as well as for the sake of showing their comparative size. One magnification having been used, namely, $\times 22$ in all figures of plants; $\times 70$ in all figures of leaves; $\times 365$ in all figures of cell structures.

No. 1 appeared in THE BRYOLOGIST for November, 1906. Three species figured on Plate IX. *L. Marchica*, *L. bicrenata*, *L. excisa*. Reproduced in January, 1907, as Plate III. with corrected magnifications.

No. 2 in January, 1907. Five species figured on Plate II. *L. Floerkii*, *L. lycopodioides*, *L. Lyoni*, *L. gracilis*, *L. barbata*.

In conclusion, *L. Kunzeana* and *L. Muelleri* are given with *L. porphyroleuca* added to the original selection. Figured on Plate I.

"LOPHOZIA KUNZEANA (Hüben.) Evans, Proc. Wash. Acad. 2: 305. 1900. *Jungermannia Kunzeana* Hüben. Hep. Germ. 115. 1834. *J. plicata* Hartm. Fl. Scand. Ed. III. 2: 329. 1838. *J. colpodetes* Tayl. Lond. Jour. Bot. 5: 280. 1846. *J. plicata** *Kunzeana* Hartm. Fl. Scand. Ed. X. 2: 137. 1871. *J. Kunzei* β *plicata* Lindb. Musc. Scand. 8. 1879. *Sphenolobus Kunzeanus* Steph. Bull. de l'Herb. Boissier, II. 2: 168. 1902. Mt. Washington, New Hampshire (*W. G. Farlow*). *Lophozia Kunzeana* has a wide distribution in the alpine and arctic regions of the Northern Hemisphere, although it is rarely abundant in one locality. In North America it has already been recorded from Greenland, from several widely scattered stations in British America, and from the Adirondack Mountains of New York. It is, however, new to New England. Professor Farlow's specimens represent a gemmiparous and rather slender form of the species.

The leaves of *L. Kunzeana* vary in form from rotund to quadrate; they are subequally bifid and tend to be complicate, although this condition is not always apparent. In rare cases there is a third lobe supplementary to one of the others. The sinus is narrow and extends to the middle or a little less. The divisions are typically rounded at the apex but are often obtusely pointed or, on slender branches, even acute. The leaf-cells have small but distinct trigones, and the cuticle is minutely verruculose or striate. The underleaves vary in size but can usually be demonstrated without much difficulty in spite of the numerous rhizoids. They are either subulate and long-acuminate or else deeply bifid with slender divisions. The gemmae when mature are thick-walled and angular: as a rule they are unicellular but are

sometimes divided by a delicate wall into two cells. In exposed localities the stems, leaves and gemmae acquire a characteristic brownish yellow coloration.

The presence of underleaves will at once distinguish *L. Kunzeana* from such species as *Sphenolobus Michauxii*, *Marsupella emarginata* and *Lophozia inflata*, all of which it somewhat resembles in general appearance. Among New England species its closest relative is undoubtedly *L. Floerkii*, which has trifold or quadrid leaflets with a little group of marginal cilia close to the postical base. There is usually no indication whatever of basal cilia in *L. Kunzeana*, although sometimes one or two minute and indistinct teeth may be found in this position.¹ Its relationship to *L. Floerkii* and to other members of the *barbatae*-group is clearly shown by the occasional presence of a third lobe and by the constant occurrence of underleaves, and it would seem as if these characters were sufficient to exclude it from the genus *Sphenolobus*, where it is placed by Stephani." EVANS, *Rhodora*, 7: 52. 1905.

PLATE I. Figs. 1-3. 1—Plant, showing underleaves and innovation $\times 22$. 2—Leaf, dorsal view $\times 70$. 3—Leaf cells $\times 365$. Drawn from material collected by M. C. A. Grape, Sweden, 1905. Sulliv. Moss Chapter Herb.

"LOPHOZIA MUELLERI (Nees) Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Jungermannia Muelleri* Nees; Lindenberg, Nova Acta Acad. Caes. Leop.-Carol. 14: suppl.: 39. 1829. *J. acuta* Lindenb. l. c. 88 (in part). *J. Libertae* Hüben. Flora 15: 305. 1832. *Lophozia acuta* Dumort. Recueil d'Obs. sur les Jung. 17. 1835 (in part). *J. Laurentiana* DeNot. Mem. Accad. Tor. II. 18: 497. f. 10. 1859. *Lophozia Libertae* Cogn. Bull. Soc. roy. Bot. de Belgique 10: 278. 1872. *J. bantriensis*, vars. *Muelleri* and *acuta* Lindb. Acta Soc. Sci. Fenn. 10: 528. 1875. *J. Hornschuchiana Muelleri* Massal. Ann. R. Ist. Bot. di Roma 3: (8). 1888. On limestone rocks. Banks of the Housatonic River (opposite Falls Village), Salisbury, Connecticut (*A. W. E.*). Already reported from Miquelon Island, from a few stations in Canada and from Colorado, but apparently new to the eastern United States. *Lophozia Muelleri* is a member of a group of closely related species which have long been a puzzle to European hepaticologists. The group has recently been studied by Schiffner,² who ascribes to it the following characters: leaves always biind; underleaves more or less developed even on slender stems; perichaetial bracts usually but little differentiated from the leaves; perianth cylindrical or barrel-shaped, terete (or slightly plicate in the upper part), contracted into a tubular beak; perigonal bracts with a third dorsal tooth. Schiffner recognizes seven species, five of which have been recorded from North America. *L. Muelleri* is distinguished from its allies by its relatively small size, by its more or less acute leaf-lobes, by its rather thin-walled leaf-cells with small but distinct trigones and a minutely verruculose or striate cuticle, by its dioicous inflorescence and by its lack of gemmae. Its nearest relative is doubtless *L. heterocolpa* (Thed.) M. A. Howe, which is known in North America from Greenland, from the shores of Lake Superior,

1. See Schiffner, *Lotos*, 49: 51. 1901.

2. Verhandl. der k. k. Zool.-Bot. Gesellsch. in Wien. 54: 381-405. 1904.

and, in the Pacific Coast region, from Yukon to California. This species is a little larger than *L. Muelleri*, the lobes of its leaves are commonly obtuse, and it produces gemmae abundantly. Among New England species *L. excisa* and *L. ventricosa* both bear some resemblance to *L. Muelleri*. These species, however, are destitute of underleaves and their perianths are widely open and dentate at the mouth. Other members of the *L. Muelleri*-group are perhaps to be expected in New England, especially in limestone districts." EVANS, *Rhodora* 8: 35. 1906.

FIGS. 4-9. 4—Plant, showing perianth $\times 22$. 5—Male plant, dorsal view $\times 22$. 6—Plant $\times 22$. 7—Leaf, dorsal view $\times 70$. 8—Leaf, ventral view $\times 70$. 9—Leaf cells $\times 365$. Drawn from material collected by Dr. A. W. Evans, Salisbury, Conn., 1897; fruiting specimens collected by Dr. Chas. Lacouture, France, 1904. *Sulliv. Moss Chapter Herb.*

"LOPHOZIA PORPHYROLEUCA (Nees) Schiffn. *Lotos* 51: (61), 1903. *Jungermannia porphyroleuca*, Nees, *Naturgeschichte der europ. Leberm.* 2: 78. 1836. *J. ventricosa* b. *porphyroleuca* Limpr.; Cohn, *Krypt.-Flora von Schlesien* 1: 280. 1876. Mt. Bigelow, Maine (*J. F. Collins* and *M. L. Fernald*, 1498, 1573). White Mountains (*W. Oakes*). Guilford, New Hampshire (Mrs. Corter). Although this species was recorded from New England by Austin¹ many years ago, it has received but scant attention from North American writers and has usually been considered a simple synonym of *L. ventricosa*. Even in Europe it has been looked upon as a species of doubtful validity. When Arnell² studied the forms belonging to the *ventricosa*-groupe a few years ago he found that the leaf-cells in *L. porphyroleuca* had large trigones while those of *L. ventricosa* had small trigones or were thin-walled throughout. Since these differences were inconstant and he could find no others to support them, he decided that *L. porphyroleuca* was hardly worthy of specific rank. Recently, however, Schiffner has shown that other differential characters may be derived from the mouth of the perianth. In *L. porphyroleuca* this is split into numerous acute lobes; the margins of these lobes are thickly and irregularly ciliate-dentate, some of the teeth attaining a length of three or four cells. In *L. ventricosa* the lobes are indistinct, and the marginal teeth are scattered and usually unicellular. It may be added that *L. porphyroleuca* grows on rotten wood and is commonly more or less tinged with red, while *L. ventricosa* usually grows on the ground or on rocks and is mostly dark green in color. Although reported from so few localities *L. porphyroleuca* is probably widely distributed in the mountains of New England." EVANS, *Rhodora* 8: 36. 1906.

FIGS. 10-14. 10—Plant, showing perianth $\times 22$. 11—Male plant, dorsal view $\times 22$. 12—Plant $\times 22$. 13—Leaf, dorsal view $\times 70$. 14—Leaf cells $\times 365$. Drawn from material (Figs. 10, 14.) collected by Miss A. Lorenz, Vermont, 1904. (Figs. 11, 13.) collected by Mrs. L. A. Carter, New Hampshire, 1902. (Fig. 12.) collected by C. C. Haynes, Adir. Mts. 1902. Above specimens in *Sulliv. Moss Chapter Herb.* New York City.

(Conclusion.)

1. *Proc. Acad. Philadelphia* for 1869: 220.

2. *Bot. Not.* 1820: 195. E. Bauer has published a German translation of Arnell's paper in *Lotos* 41. 1893.

NORTH AMERICAN SPECIES OF AMBLYSTEGIELLA.

BY GEORGE E. NICHOLS.

The genus *Amblystegium*, as proposed by Bruch & Schimper¹ in 1858, comprised sixteen species which, up to that time, had been included under *Hypnum* and *Leskea*. Four of these have since been reduced to varietal rank. Seven years later Schimper² adopted the genus, excluding, however, three species and adding three others. The limits of the genus have been variously considered by later authors. De Notaris³, followed by Mitten, Lindberg and Braithwaite, extended its boundaries to include many species formerly referred to *Hypnum*, but which bryologists of the present day tend to distribute among *Chrysohypnum*, *Cratoneuron*, *Calliergon*, *Drepanocladus*, and *Hypohypnum*. The generic limits recognized by Schimper, however, seem to be more natural, and he has been followed by the majority of recent European and American writers.

As defined by Schimper, and recently treated by Cheney⁴, the genus *Amblystegium* embraces two distinct groups of mosses. One group, of which *A. subtile* may be considered typical, comprises species of small size, characterized by the absence of a central-strand in the stem and by the greatly reduced, usually obsolete, nerve in the leaves. In the other group, which includes *A. varium* and the allied species, in addition to the larger size of the plants, the stem possesses a distinct central-strand, while the nerve of the leaves is clearly defined, reaching to the middle of the leaf or beyond.

Hampe, in 1871⁵, although recognizing *Amblystegium*, transferred the species *A. subtile* and *A. Sprucei* to *Leskea*, giving to the group thus formed the subgeneric title *Serpo-Leskea*. Both Limpricht⁶ and Roth⁷ have recognized Hampe's sub-genus, but place it under *Amblystegium*.

Loeske, in 1903⁸, raised *Serpo-Leskea* to generic rank, proposing the name *Amblystegiella* for the genus and adding a third species, *Amblystegium confervoides*. Loeske's opinion evidently changed regarding the untenability of Hampe's name, for, in 1904⁹, he retracted *Amblystegiella*, substituting *Serpoleskea* Hampe. Warnstorf also, in 1905¹⁰, designated the genus as *Serpoleskea*. The application of Articles 38 and 39 of the Vienna Rules of Nomenclature, however, made it apparent that, as a generic title, *Amblystegiella* Loeske had priority over *Serpoleskea* (Hampe) Loeske, and, in 1907¹¹, Loeske again brought forward *Amblystegiella*.

Loeske's genus is based chiefly on the absence of central-strand in the stem and the lack, or obscure development, of the nerve in the leaves. The same distinction serves primarily to separate *Rhynchostegium* Br. & Sch. and *Sematophyllum* Mitt. (*Raphidostegium* (Br. & Sch.) De Not.), according to the conception of these genera as given by Roth¹² and Warnstorf¹³. In the opinion of the writer, *Amblystegiella* Loeske ought therefore to be accepted.

The synonymy of North American species which should be referred to this genus is given below:

1. **Amblystegiella minutissima** (Sulliv. & Lesq.) Comb. nov.
Hypnum minutissimum Sulliv. & Lesq. in Gray, Man. Ed. II. 678. 1856.
Amblystegium minutissimum Jaeg. & Sauerb. Adumb. Flor. Musc.
2: 547. 1878.
2. **AMBLYSTEGIELLA SPRUCEI** (Bruch) Loeske, Moosfl. d. Harzes, 295. 1903.
Leskea Sprucei Bruch in Spruce, Lond. Journ. Bot. **4:** 180. 1845.
Hypnum Sprucei Bruch in C. Müll. Syn. Musc. Frond. **2:** 415. 1851.
Amblystegium Sprucei Br. & Sch. Br. Eur. fasc. **55-56:** 5. *pl. 1.* 1853.
Leskea (Serpo-Leskea) Sprucei Hampe, Verhandl. d. k. k. Zool.-Bot.
Gesellsch. Wien. **21:** 390. 1871.
Serpoleskea Sprucei Loeske, Verhandl. d. Bot. Ver. d. Prov. Brandenb.
46: 190. 1904.
3. **AMBLYSTEGIELLA CONFEROIDES** (Brid.) Loeske, Moosfl. d. Harzes 295. 1903.
Hypnum confervoides Brid. Spec. Musc. **2:** 153. 1812.
Leskea confervoides Spruce, Lond. Journ. Bot. **4:** 182. 1845.
Amblystegium confervoides Br. & Sch. Br. Eur. fasc. **55-56:** 6, *pl. 3.*
1853.
Serpoleskea confervoides Loeske, Verhandl. d. Bot. Ver. d. Prov.
Brandenb. **46:** 190. 1904.
4. **AMBLYSTEGIELLA SUBTILIS** (Hedw.) Loeske, Moosfl. d. Harzes 295. 1903.
Leskea subtilis Hedw. Musc. Frond. **4:** 23. *pl. 9.* 1793.
Hypnum subtile Hoffm. Deutschl. Fl. **2:** 70. 1796.
Amblystegium subtile Br. & Sch. Br. Eur. fasc. **55-56:** 4 *pl. 1.* 1853.
Leskea (Serpo-Leskea) subtilis Hampe, Verhandl. d. k. k. Zool.-Bot.
Gesellsch. Wien. **21:** 390. 1871.
Serpoleskea subtilis Loeske, Verhandl. d. Bot. Ver. d. Prov. Brandenb.
46: 190. 1904.
5. **Amblystegiella adnata** (Hedw.) Comb. nov.
Hypnum adnatum Hedw. Spec. Musc. 258. *pl. 64. f. 5-10.* 1901.
Amblystegium adnatum Mac. & Kindb. Cat. Can. Pl. **6:** 210. 1892.

Yale University.

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1. Br. Eur. fasc. **55-56.** 1853.
 2. Synops. Musc. Eur. 704-720. 1860.
 3. Epil. d. Bri. Ital. 1869.
 4. Bot. Gazette **24:** 236-291, *pl. 11-13.* 1897.
 5. Verhandl. d. k. k. Zool.-Bot. Gesellsch. Wien **21:** 390. 1871.
 6. Rabenhorst, Kryptogamenfl. v. Deutschl. Laubm. **3:** 295. 1904.
 7. Eur. Laubm. **4:** 508. 1905.
 8. Moosfl. d. Harzes 294. 1903.
 9. Verhandl. d. Bot. Ver. d. Prov. Mark Brandenb. **46:** 190. 1904.
 10. Kryptogamenfl. v. Mark Brandenb. Laubm. **2:** 348. 1905.
 11. Verhandl. d. Bot. Ver. d. Prov. Mark Brandenb. **49:** 61. 1907.
 12. l. c. pp. 423, 599.
 13. l. c. p. 764.

ADDITIONS TO THE LICHEN FLORA OF SOUTHERN CALIFORNIA.

By Dr. H. E. HASSE.

- Ramalina pollinaria* (Ach.) f. *humilis* Ach. (Cromb. Bri. Li. I, 94. Fr. Li. Scand. 39). Shrubs on bluffs back of Newport.
- Heppia Bolanderi* (Tuck.) Wainio. *Pannaria* Tuck. Can. Li. 51). Not uncommon on calcareous rock in the Santa Monica Mts.
- Theloschistes lynchnus pygmaeus* Fr. Maritime sandstone at Newport.
- Placodium eugyrum* Tuck. Thallus of small radiate squamules, lobes rounded at circumference and contiguous. Matilija Cañon, Ventura Co.
- Lecanora pallescens* (L.) Schaer. var. *rosella* Tuck. With the type on trap rock, Topanga Cañon, Santa Monica Mts.
- Biatorella (Sarcogyne) clavus* (DC.) Flk. Santa Monica Mts.
- Rinodina radiata fimbriata* Tuck. Trap rock, Santa Monica Mts.
- Cladonia caespititia* (Pesz.) Flk. Earth at base of rocks.
- “ *pyxidata* Fr. forma *synthetica* Ach. and *lophyra* Coem. (Crombie l. c.).
- All three in the Santa Monica Mts.
- Lecidea* (sect. *Biatora*) *effusa* (Sm.) Hepp. On *Umbellularia* and *Ceanothus divaricatus*. Santa Monica Mts.
- Lecidea* (sect. *Biatora*) *viridescens* (Schr.) Fr. On charred bark of *Pseudotsuga*. In the San Gabriel Mts.
- Lecidea Manni* Tuck. Thallus cartilaginous of round, convex sordid, yellowish-brown squamules. Apothecia middling size, disk flat, black with a bloom and a moderately thick, cinerascens, irregular and sinuous margin. Hymen 100 μ high. Hypothecium brown, much thicker than the thecium. Paraphyses thick, coherent. Epithecium brown gradually paling downward. Thecae half as high as the paraphyses and 10 μ thick. Spores ellipsoid, simple, colorless, 20 μ long and 5 μ thick. On calcareous rock, Matilija Cañon, Ventura Co.
- Lecidea enteroleuca pilularis* (Th. Fr.) (Fr. Li. Scand. p. 543). Thallus pale greenish-gray, verruculose-areolate with a black hypothallus. Apothecia deeply sessile, flat to slightly convex and then immarginate. Hypothecium pale. The closely crowded verrucae of the deeply areolate crust make this a marked form. Sandstone, Topanga Cañon, Santa Monica Mts.
- Catillaria lenticularis* (Ach.) *ecrustacea* Hepp, Leighton l. c. 336. Thallus absent. Apothecia velvety, black with a thin, entire, black, finally disappearing margin, disk at times sinuate and even somewhat umbilicated. Hymenium 80 μ high; paraphyses coherent; epithecium light brown, granulose. Thecae of nearly the same length with the paraphyses and 16 μ thick. Spores 8nae, bilocular, 16 μ long, 6 thick. Hypothecium colorless. Sand rock, Catalina Island.
- Catocarpon myriocarpum* (Mudd) f. *ecrustacea* (Leight.) (Leighton l. c. p. 320). Decomposed granite, Verdugo hills.
- Catocarpon myriocarpum* (Mudd) v. *punctiformis* (Mudd) Fr. l. c. p. 595). Sandstone, Santa Monica Mts.

Lecanactis Salicina A. Zahlbruckner, sp. nov. in litt. Conspicuously distinguished by a densely white pruinose disk. On *Salix lasiolepis*, Rustic Cañon, Santa Monica Mts. Sawtelle, California.

A NOMENCLATURE NOTE.

JOHN M. HOLZINGER.

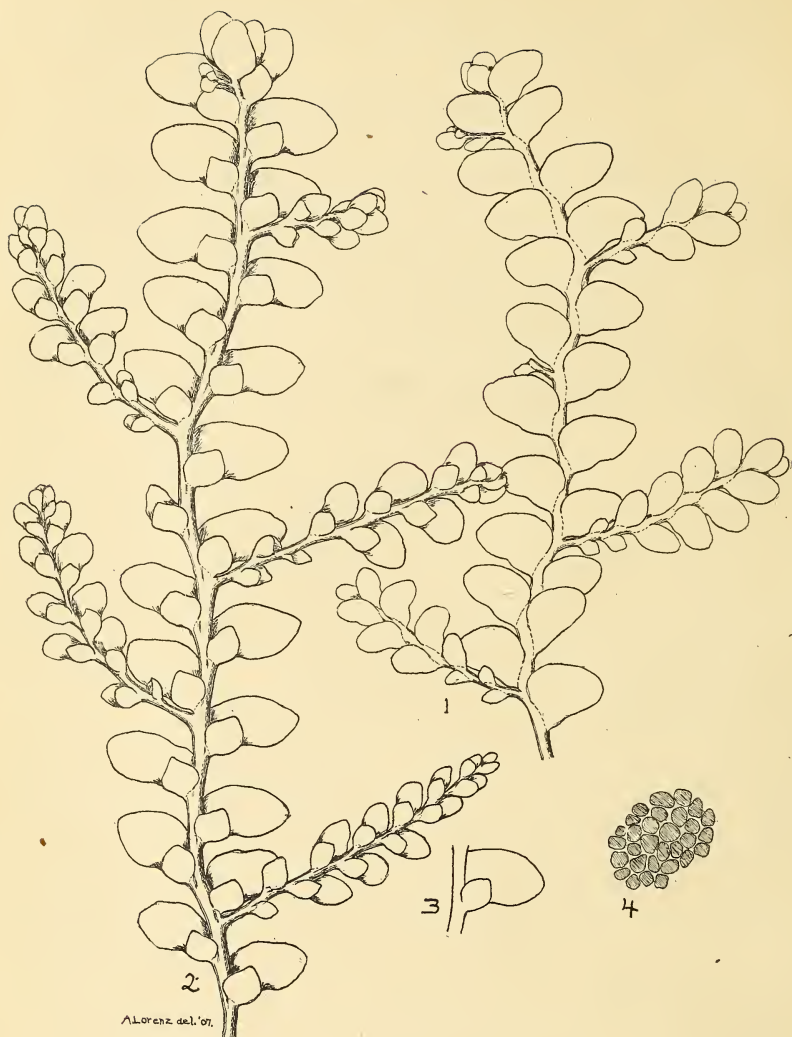
The vicissitudes of scientific names are curiously illustrated by the way *Homalotheciella subcapillata* (Hedw.) Card. (1904) came to displace *Burnettia subcapillata* (Hedw.) Grout (1903). When the writer chose the former generic name for the D. C. moss published in the September, 1907, BRYOLOGIST, he considered as correct Mr. Cardot's contention in THE BRYOLOGIST of March, 1904. And the statement in Dr. Sudworth's published comments (l.c. p. 91) that "Grout's position in passing over these two section names of Cardot's is unsupported, etc." seemed also eminently fair and correct. The correspondence brought on by this publication, however, has, together with repeated study of the Vienna Code, led to a different conclusion.

It appears that it was Dr. Grout's discovery that *Homalothecium* is not tenable. He therefore published *Burnettia* in July, 1903 (BRYOLOGIST, p. 65). At the time of this publication this author was not aware that Mr. Cardot had, in 1899, four years before, established two sections of the genus *Homalothecium*; *Homalotheciella*, and *Euhomalothecium* (Bull. Herb. Boiss. Vol. 7, p. 374). And even had he known of Mr. Cardot's section names, Dr. Grout was not compelled, by any rule in the Code of Vienna at least, to adopt *Homalotheciella* in place of *Homalothecium*. This of course is indicated only in Recommendations XXIX, p. 47, of that Code. It must therefore be admitted that he was quite within his right as author to establish *Burnettia*. And, according to the Vienna Code it seems that, other things being equal, *Burnettia* would stand even against Mr. Cardot's contention on behalf of his own first section name superceding *Homalothecium*, in THE BRYOLOGIST, March, 1904. In corroboration of this, note the first example under Art. 49, p. 48, where the section *Campanopsis* R. Br. (1810) of the genus *Campanula* was in 1814 first raised to generic rank by Schrader, who called the genus thus split off *Wahlenbergia*; it helped Mr. Otto Kuntz not a bit to resuscitate Robert Brown's *Campanopsis*. This author had used *Campanopsis* surely not as a generic name. Thus Schrader's is the first generic name really published, and so stands, although published four years later than "Campanopsis."

Here, however, the parallelism ends. For, correspondence has unearthed the fact that *Burnettia* Grout is antedated by over fifty years by *Burnettia* Lindb., for a genus of Orchids, and "has been in continuous use ever since." The next earliest tenable name published for *Homalothecium* as a genus name is, therefore, *Homalotheciella* Cardot, 1904; this is because *Burnettia* 1903 was preoccupied, not because Mr. Cardot's argument was right.

Curiously, in this little quadrangular affair, every one involved appears to have been partly wrong. At least the writer cheerfully confesses himself to have been in error as herein stated.

Winona, Minn.



EXPLANATION OF PLATE II.

Radula tenax Lindb. Fig. 1, plant, antical view, $\times 80$; Fig. 2, plant, postical view, $\times 80$; Fig. 3, single leaf, $\times 80$. Fig. 4, cells from middle of leaf, $\times 480$.

These figures were drawn from specimens collected by the writer at Waterville, New Hampshire (No. 228).

NOTES ON RADULA TENAX LINDB.

ANNIE LORENZ.

As the species under consideration has not heretofore been figured, some drawings and notes on the subject may be of interest.

The writer has found *R. tenax* at two stations at Waterville, New Hampshire: in both cases it was upon granite and at an altitude of 1800 ft. At the Cascades, the plants grew on the southern and western faces of the rocks, while at Greeley Pond they had chiefly a northern exposure.

Radula tenax prefers the vertical faces of the rocks, and a moist atmosphere, but not wet rocks. All the descriptions consulted give its habitat as old logs, but all the Waterville specimens were on rocks. It has the general appearance of *Lejeunea cavifolia* (Ehrh.) Lindb. and is bronze green in color. Leaves with minute trigones. The perianth is unknown. Its New England distribution, as hitherto reported, is—N. H., Mass., Conn.

The following description is taken from Underwood, Descriptive Catalogue of N. Am. Hepaticae north of Mexico. Bull. of Ill. State Lab. of Nat. Hist. Vol. II. Art. I (1883).

Radula tenax Lindb. Hep. Hibern, p, 492. 1875.

“Dioecious: stems brownish-green, rigid, tenacious; leaves remote, scarcely decurrent, obliquely elliptic-ovate, opaque, the cells rounded and strongly chlorophylliferous, the posterior lobe rotund-ovate, scarcely half the breadth of the stem, the interior margin free, rotund, equal to the width of the stem or more, the apex plane or scarcely incurved: male spike borne on the side of the stem below the carina of the leaf, long-linear, somewhat obtuse.

On rotten trunks, Md. N. C. Catskills, mostly in mountain regions.

Exsic. Musci All. No. 261. Hep. Bor. Am. No. 87.”

Hartford, Conn.

BOOK REVIEW.

MOSES AND LICHENS. By Nina L. Marshall, profusely illustrated in color, half-tones and line. 8vo. New York. Doubleday, Page & Co. \$4.00.

The introductory chapters are well written and are interesting and generally accurate.

The drawings are many of them decidedly poor and some have a familiar look, though there are no acknowledgments.

I will defy anybody however familiar with the mosses to put the right labels on the greater proportion of the colored plates and other photographs without seeing them previously labeled. Even the author has labeled as *Climacium dendroides* one of the colored figures which is not that species and is probably meant for *Leucobryum* to judge from the quotation below it. On page 55 the explanation of the action of the peristome of *Polytrichum* is decidedly original as I recall no such facts in literature or elsewhere.

The arrangement of genera and species in the mosses is unlike that in any other work and has the merit of originality. I hope some day to have the plan explained to me.

Tetrodontium, one of the very rarest and least collected of our genera is described, but *Leucodon* and *Thelia*, two very common and easily recognized genera are omitted, as are also *Philonotis* and *Homalia*. Under *Plagiothecium* *P. Muellermanum* alone is mentioned although a rare and difficult species, while the omnipresent *P. denticulatum* will be collected by almost every student on his first serious collecting trip.

The colored plates of mosses, lichens and hepatics are scattered throughout the work with apparently little reference to the accompanying text, a most inconvenient arrangement for students; possibly it was not planned for such.

Some of the common names given are interesting as well as original and the author evidently has not exhausted her talent for she is able to call *Funaria hygrometrica* "The Golden Cordmoss" and the "Watermeasuring Cordmoss." *Hypnum uncinatum* becomes the "Hooked Boat hooked Moss," *H. splendens* the "Glittering Feather Moss" and *H. triquetrum*, the "Triangular Woodrevealer."

A figure of the seta and capsule of *Mnium hornum* with calyptra clasped around the upper part of seta is described as a seta bearing a bract.

Our readers are advised to spend an hour or two studying this book as many other points of interest will doubtless be discovered.

It is greatly to be regretted that popular scientific books should be so often written by people who do not have a first-hand knowledge of the subject, and that publishers with the resources of Doubleday, Page & Co. should issue such an inferior book when a first class book of this nature would have been so helpful to the people whom the *BRYOLOGIST* and its editors are striving to interest in the study of these plants.

A. J. GROUT,
Brooklyn, N. Y.

SULLIVANT MOSS CHAPTER ANNUAL REPORTS.

Report of the President.

TO THE MEMBERS OF THE SULLIVANT MOSS CHAPTER:

The Sullivant Moss Chapter now stands at the beginning of the second decade in its life. The membership is nearly seven times that of the first year; the field of work, from a correspondence study of common mosses, has broadened to include material in any way connected with the bryophytes or lichens of North America; the *BRYOLOGIST* has quadrupled in the number of pages, and advanced from a quarterly department in the Fern Bulletin to an independent bimonthly. Perhaps the Chapter was founded at the psychological moment, doubtless the great increase of popular interest in nature has been a favoring factor, but be that as it may, the success of the Chapter has been due to the energy and self-sacrifice of the early members.

Regarding the future, two things are to be urged upon the members. First, a more intensive study of geographical distribution, in which each member can help by the careful investigation of any locality. Secondly, an increase of the interest in the Exchange Department. The past year has seen the beginning of the distribution of specimens from foreign localities.

To continue this it is necessary to offer more frequently those species that are peculiar to this continent, especially those of limited range. It is hoped that a general effort can be made to stimulate this department into full activity.

The opening of the new year brings to a close my tenure of office as President of the Chapter. At this time I wish to assure all members of my sincere appreciation of the help that they have given me during the three years just past. Without their ready cooperation, which was always forthcoming, the prosecution of the chapter work would have been impossible. Most of all do I acknowledge the kindness of those who have so patiently borne with me during the delays in the determination of mosses; the demands of school work have, I fear, too often crowded out other things. To the Chapter and to all its members I extend hearty greetings for the new year.

EDWARD B. CHAMBERLAIN,
Retiring President.

Report of the Secretary.

During the past year, the Chapter has added twenty-five new members to its roll, many of whom live in other countries than the United States. The Chapter has lost thirteen by withdrawal and five by death, therefore begins the year 1908 with one hundred and seventy-two members.

The herbarium has been increased by a number of foreign contributions. Mr. Nicholson has sent a packet of British mosses, Mous. Renauld a packet of European mosses, and Mr. Okamura a fine lot of Japanese mosses. Very few of these last are of species found in North America.

An effort has been made to insure the herbarium but the insurance companies are unwilling to do so until the herbarium is better housed and provided for.

Through one of our French colleagues, all the *Philonotis* in our collection will soon be correctly determined.

A great many of the contributions from North America are duplicates of what is already in the herbarium. These should by some means be available to Chapter Members for increasing their collections.

The thanks of the Chapter are due Mr. Chamberlain for his efforts in conducting exchanges with foreign members.

The herbarium is again the richer this year by contributions from many of our American members; Messrs Chamberlain, Foster, Dupret, Bonser, Brenckle, Holzinger, Haydock, Nichols, Mrs. Smith, and many others who have listed exchanges in the *BRYOLOGIST*. The secretary wishes to thank the others officers for their help and suggestions.

Seattle, Wash.

JOHN W. BAILEY.

The Report of the Lichen Department by Mr. G. K. Merrill, is promised for the March number.

REPORT OF THE TREASURER.

The following statement for the year beginning December 1, 1906, and ending December 1, 1907, is respectfully submitted:

RECEIPTS.

By cash on hand December 1, 1906.....	\$ 47.80
By dues from members.....	192.50
	<u>\$240.30</u>

DISBURSEMENTS.

To THE BRYOLOGIST.....	\$157.50
To Expressage (A. A. A. S. Meeting).....	.75
To E. B. Chamberlain, Printing, Postage, etc.....	3.25
To Treasurer, Postage, Stationary, etc.....	5.00
	<u>\$166.50</u>
To cash on hand December 1, 1907.....	73.80
	<u>\$240.30</u>

ANNIE MORRILL SMITH, Treasurer.

REPORT OF THE HEPATIC DEPARTMENT.

Interest continues. The Herbarium numbers one thousand and sixty-seven specimens; of these two hundred and ninety-eight were turned in this year. The whole collection represents eighty-three genera and three hundred and ten species. There remain perhaps one hundred not ready to be placed in the Herbarium until next year. There are many duplicates and I have been distributing four hundred of these recently with duplicates of my collecting.

The following States, etc., are more or less represented: Canada, Connecticut, District of Columbia, Florida, Georgia, Maryland, Maine, New Jersey, New York, New Hampshire, North Carolina, Nova Scotia, Pennsylvania, Rhode Island and West Virginia. We have but a few specimens from Iowa, Massachusetts, Minnesota and Mississippi. Will members from these and unrepresented States send in specimens during the coming year?

Respectfully submitted,

CAROLINE COVENTRY HAYNES,

Highlands, New Jersey.

REPORT OF JUDGE OF ELECTION.

The following report of the elections of officers of the Sullivant Moss Chapter for the year 1908 is respectfully submitted:

Whole number of votes cast.....	11
For President, Dr. T. C. Frye	11
For Vice-President, Miss C. C. Haynes.....	11
For Secretary, Mr. N. L. T. Nelson.....	11
For Treasurer, Mrs. Annie Morrill Smith.....	11

LYDIA PRICHETT BORDEN,

Judge of Elections.

LIST OF SULLIVANT MOSS CHAPTER MEMBERS.

Star * indicates Charter Members.

Adams, Miss. Carrie E	R. F. D. 1, Hinsdale, N. H.
Adams, Mr. F. M.....	Box 515, Sharon, Mass.
Ames, Mr. Oakes	North Easton, Mass.
Anderson, Mr. John A.....	High School, Dubuque, Iowa.
Annand, Mr. George P.....	39 Brown street, Waltham, Mass.
Badè, Dr. William Frederic.....	2616 College Avenue, Berkeley, California.
Bailey, Dr. John W.....	4541 Fourteenth Avenue, Seattle, Wash.
Baker, Prof. C. F.....	Museu Goeldi, Para, Brazil, South America.
*Barbour, Mr. Wm. C	Sayre, Pa.
Barnes, Prof. Charles R.....	Dept. Botany, Univ. of Chicago, Chicago, Ill.
Beckett, Mr. T. W. Naylor	Fendalton, Christ Church, New Zealand.
Best, Dr. George N.....	Rosemont, New Jersey.
Bethel, Mr. E.....	270 S. Marion street, Denver, Colorado.
Bonser, Prof. Thomas A	E. 12 Nora Avenue, Spokane, Wash.
Borden, Miss Lydia Prichett.....	Manoa, Delaware Co., Pa.
Brenckle, Dr. J. F.....	Kulm, North Dakota.
Brigham, Miss Julia P	138 Pleasant street, Marlborough, Mass.
*Britton, Mrs. Elizabeth G.....	N. Y. Botanical Garden, Bronx Park, N. Y. City.
Brotherus, Dr. V. F	Helsingfors, Finland, Sweden.
Browne, Mrs. A. F.....	Sandy Cove, Digby Co., Nova Scotia.
Bruce, Mr. C. Stanley.....	Shelburne, Nova Scotia.
Bryant, Miss Elizabeth B	32 Reedsdale street, Allston, Mass.
Burnham, Mr. Stewart H.....	Geological Hall, State Bot. Office, Albany, N. Y.
Calkins, Mr. W. W.....	Berwyn, Illinois.
Cardot, M. Jules.....	Square du Petit Bois, Charleville, Ardennes, France.
Carr, Miss C. M., R. F. D. 3	South Framingham, Mass.
*Carter, Mrs. H. R.....	37 Church street, Laconia, N. H.
*Chamberlain, Mr. Edward B	38 West 59th street, New York City.
*Chapin, Mrs. Louis N.....	Brooklyn, New York.
Chase, Mrs. Agnes.	116 Florida Avenue, N. W., Washington, D. C.
Chase, Mr. Virginus H.....	Wady Petra, Stark Co., Illinois.
Chatterton, Mr. F. W.....	227 Townsend Ave., New Haven, Conn.
Cheever, Dr. Clarence A.....	1531 Blue Hill Avenue, Mattapan, Mass.

- Choate, Miss Alice D. 523 Pendleton Avenue, St. Louis, Mo.
 Clapp, Mrs. J. B. 52 Hartford street, Dorchester, Mass.
 Clark, Mr. H. S. 16 Lynden Place, Hartford, Conn.
 Clarke, Miss Cora H. 91 Mt. Vernon street, Boston, Mass.
 *Collins, Prof. J. Franklin 468 Hope street, Providence, R. I.
 Copeland, Mr. W. F. Ohio University, Athens, Ohio.
 Craig, F. R. M. S., Mr. T. 1013 Sherbrooke street, Montreal, Canada.
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During the year 1907: Prof. E. E. Bogue, Agricultural P. O., Michigan; Mrs. L. M. Coomes, Queens, N. Y.; Prof. Clara E. Cummings, Wellesley, Mass.; Mr. B. D. Gilbert, Clayville, N. Y.; Mrs. Mary L. Stevens, Brookline, Mass.

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MARCH 1908



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICS AND LICHENS

EDITOR

ANNIE MORRILL SMITH

ASSOCIATE

ABEL JOEL GROUT, Ph.D.

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Fig. 1.



Fig. 2.

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No. 2

FURTHER NOTES ON CLADONIAS. XIV.

Cladonia digitata, Cladonia deformis and Cladonia bellidiflora.

BRUCE FINK.

In closing this series of papers with the present one, it seems necessary to consider three lichens which are somewhat closely related, have a very similar geographical distribution, and are quite closely related through *Cladonia deformis* to *Cladonia coccifera*, considered in the last paper. While the relation between these two lichens is not close enough to cause any difficulty as a rule, certain conditions may easily be confused, especially when immature. L. Scriba says in a letter, "but *C. deformis* is covered by mealy (farinose) soredia and *C. coccinea pleurota* by granulose soredia." Also, while the first two lichens of the present paper are usually distinct enough, the writer has collected specimens that were very difficult to locate, seeming to occupy a medium place between the two species. *Cladonia bellidiflora* does not grow with the other two usually, and could scarcely be confused with them, but it is very frequently found growing with *Cladonia coccifera*, as the writer found in Washington and in Alberta in the summer of 1906. However, *Cladonia bellidiflora* is quite distinct from *Cladonia coccifera*, and would not be confused with it by one fairly well acquainted with lichens.

There are a number of scarlet-fruited Cladonias that might well receive attention in this series of papers, but they are southern in distribution, for most part, and have not been studied very closely by the writer, nor has more than one of them been submitted to Dr. Wainio. They are *Cladonia leporina*, *Cladonia reticulata* (= *C. Boryi*), *Cladonia papillaria* and *Cladonia Santensis*.

There has been no attempt made in this series of papers to consider all of the North American Cladonias, but the object has been rather to discuss those species which the writer has come in contact with most by collecting and through specimens for determination and on which he has the aid of Dr. Wainio very extensively.

In closing the series, the writer wishes once more to express our very great indebtedness to Dr. Wainio for the aid so freely given to our study of the Cladonias, to L. Scriba, whose European specimens and determinations have also aided greatly, to many persons who have aided by their collecting, to the editor of THE BRYOLOGIST for excellent service, and to those who have aided with photographs.

CLADONIA DIGITATA (Auctt.) Schaer. Lich. Helv. Spic. 22. 1823. Primary thallus persistent or finally dying, composed of lobed or incised, large or medium sized squamules, which are 2-15 mm. long and wide; involute or

somewhat flat; scattered or clustered; sea-green or rarely olivaceous above, white below or dull or yellowish toward the base; sometimes sorediate at the margin and below. Podetia arising from the surface of the primary thallus; rather short but well developed, 10–50 mm. long; the lower part, 0.5–4 mm. in diameter and cylindrical or often incrassate below the cups; erect or decumbent; simple or repeatedly proliferous; the upper part and especially the cups sorediate or the cavity of the cups often corticate; the lower part or sometimes the whole podetium covered with a continuous cortex; without squamules or more or less squamulose, whitish or yellowish-sea-green. Cups medium sized, 3–10 mm. in diameter, 2–5 mm. high; commonly abruptly dilate, regular or irregular; the margin commonly somewhat incurved, subentire, dentate, radiate or proliferate; imperforate. Apothecia medium sized, large or rarely small, 0.5–5 mm. in diameter; at the apices of the branches or rarely on the margin of the cups; simple or clustered; convex or immarginate; scarlet. Hypothecium pale. Hymenium scarlet above, pale red below. Paraphyses simple or rarely branched, somewhat enlarged toward the apex. Asci cylindrico-clavate.

On trunks and decaying wood in forests. Examined by the writer from Minnesota and Alberta (Bruce Fink), White Mountains (W. G. Farlow). Newfoundland (A. C. Waghorne). J. Macoun's catalogue of Canadian plants records several localities from British America. The distribution for this species and *Cladonia deformis* is about the same, both American and foreign, both plants being confined to cold regions, but *Cladonia deformis* is by far the more common plant, at least in North America. Besides *Cladonia digitata monstrosa* (Ach.) Wainio Mon. Clad. Univ. 1: 128. 1887, which is the common form and which we will consider the species, the following variety has been noted in North America:

CLADONIA DIGITATA CERUCHOIDES Wainio Mon. Clad. Univ. 1. 133. Podetia at least in part cupless with obtuse or subulate apices.

Dr. Wainio records this variety from Oregon, collected by Dr. Lyall. He also records from three localities in Europe

CLADONIA DEFORMIS (L.) Hoffm. Deutschl. Fl. 120. 1796. Primary thallus usually dying away, when present composed of incised, crenate or lobed, medium sized squamules, 2–7 mm. long and wide; ascending or depressed, flat or somewhat involute or convex; sometimes lacunose; scattered or clustered; sea-green varying toward lighter or reddish, or even light red toward the base; below pale or brownish and sometimes sorediate. Podetia arising from the surface of the primary thallus, 25–85 mm. in length and 1–5 mm. in diameter; subcylindrical or rarely elongate-turbinate, cup-bearing or rarely cupless; erect; partly or entirely and uniformly sorediate, the lower portion usually corticate, the cortex continuous and lacunose, or rimose; the lower portion sometimes squamulose; the corticate portion yellow straw-colored to sea-green, the sorediate part sulphureous or straw-yellow. Cups gradually or abruptly dilated, imperforate, medium sized or small, 3–10 mm. in diameter; the margin subentire, dentate or often irregularly lacerate or proliferate; the proliferations solitary or numerous and their apices minutely

cup-bearing or obtuse; from one to three ranks, the lower rank long, the upper ranks and proliferations short; the cavity of the cups usually minutely farinose. Apothecia usually medium sized 0.5–5 mm. in diameter; scattered on the margins of the cups, or clustered at the dilated apices of the proliferations; convex or depressed; commonly having a thin margin; scarlet. Hypothecium pale. Hymenium pale below and pale scarlet above. Paraphyses sometimes branched, not often enlarged or colored toward the apex. Asci cylindrico-clavate. Plate III. Fig. 1.

On earth or rarely on rotting wood, on earth over rocks or in burned woods. Examined by the writer from Maine (Clara E. Cummings), New Hampshire (W. G. Farlow, Clara E. Cummings, G. K. Merrill, and Miss Cumming's specimen was a rather immature one referred to *Cladonia cornucopioides pleurota* in L. B. A.), Minnesota, Washington and Alberta (Bruce Fink), Wyoming (Aven Nelson), Montana (L. H. Pammel), Newfoundland (A. C. Waghorne), Alaska (Wm. Trelease), Canada (J. Macoun). C. H. Peck records from New York, and J. Macoun adds many localities in British America in his catalogue. Thus the distribution is throughout the northern United States and British America and southward in the mountains. Found in all the grand divisions.

CLADONIA BELLIDIFLORA (Ach.) Schaer. Lich. Helv. Spic. 21, 1823. Primary thallus finally disappearing or rarely persistent, composed of lacinate or incised crenate, medium sized or small squamules, which are 2–5 mm. in length and 0.5–1 mm. in width; ascending or nearly erect; nearly flat or somewhat involute; scattered or clustered; sea-green varying toward straw-colored, yellowish or whitish above and white below, or varying toward yellowish or brownish toward the base of the squamules; without soredia. Podetia arising from the squamules of the primary thallus or from those at the base of old podetia, or even as branches of old podetia; commonly elongated, 20–75 mm. in length and 0.5–5 mm. in diameter, subcylindrical or tubaeform, cup-bearing or without cups and subulate; ranks usually 1–3, the lowest and sometimes all of them elongated; sometimes branched: sides sometimes perforate; clustered or scattered; erect (with erect branches if present) or decumbent curved or flexuous; corticate and without soredia, the cortex smooth or verrucose, continuous to dispersed-areolate, or partly decorticate; more or less squamulose; corticate portions sea green, varying toward yellow, straw-colored or whitish, the decorticate portions whitish or straw-colored. Cups small, about 2–7 mm. in diameter; abruptly dilated, or scarcely wider than the tops of the podetia; quite regular or oblique; the margin subentire or dentate, or rarely proliferate with one to several proliferation from the margin of the cup or rarely from the centre. Apothecia small or medium sized, about 0.5–4 mm. in diameter; clustered or conglomerate on the apex of the somewhat dilated podetium or on the margin of the cup; at first flat and thinly margined, but soon becoming convex and immarginate (?), often becoming irregular and perforate; scarlet. Hypothecium pale or cloudy. Hymenium pale below and reddish above. Paraphyses usually simple and but little thickened toward the apex. Asci clavate or cylindrico-clavate. Plate III. Fig. 2.

On earth or on earth over rocks, especially in high and open places. Examined by the writer from Washington and Alberta (Bruce Fink), Vancouver Island (J. Macoun), Alaska (Trevor Kincaid). J. Macoun records from quite a number of localities throughout British America, Clara E. Cummings from many localities in Alaska, and Dr. Wainio adds California. This gives a general distribution throughout British America and Alaska, and from two states on the Pacific coast. This is the form *coccocephala* (Ach.) Wainio Mon. Clad. Univ. 1: 204. 1894, which is found in Europe, Asia and South America.

CLADONIA BELLIDIFLORA Hookeri (Tuck.) Nyl. Syn. Lich. 221. 1860 Podetia elongated, cup-bearing, destitute of squamules (or finally sparsely squamulose).

Recorded from Newfoundland and western arctic America by Dr. Wainio, and Clara E. Cummings reports it from several localities in her Lichens of Alaska. Known also in Europe, Asia and South America.

CLADONIA BELLIDIFLORA RAMULOSA Wainio Mon. Clad. Univ. 2: 210, 1894. Podetia quite short, about 10–20 mm. long and 0.7–2 mm in diameter, cupless and apices quite obtuse, radiately, fasciculately or dichotomously branched at or near the apex, with divaricate and quite short branches; destitute of squamules or sparsely squamulose.

Recorded from Finland by Dr. Wainio and from Alaska by Clara E. Cummings. Of this plant Dr. Wainio says, "Habitu subsimilis est *Cl. cristatellae* Tuck., sed sine dubio e *Cl. bellidiflora* est evolute."

The illustration of *Cladonia deformis* is from No. 66, "Lichenes Boreali-Americani," and that for *Cladonia bellidiflora* is from a collection made by the writer at Glacier, British Columbia.

Miami University, Oxford, Ohio.

Concluded.

NOTES ON NOMENCLATURE IX.

ELIZABETH G. BRITTON.

Part 229 of Brothrus' Mosses in Engler and Prantl Pflanzenfamilien was received on October 25th, 1907. It includes pages 961–1008, completes the *Hookeriaceae* and takes up the *Hypopterygiaceae*, *Helicophyllaceae*, *Rhacopilaceae* and *Leskeaceae*.

All but the last are tropical or subtropical in their distribution with one remarkable exception: *Hypopterygium Canadense* Kindb., from Queen Charlotte Island, British Columbia, is the only representative of this genus further north than Mexico or Cuba. Through the kindness of Professor Macoun, I have recently seen the type specimens and they undoubtedly belong to this tropical genus. It is one of those anomalous cases of distribution which finds its parallel at Killarney, Ireland, where a filmy fern and one of the *Hookeriaceae*, *Cyclodictyon latevirens*, are unique examples. This may be a survival of a tropical flora extending northward to the Yukon. *Rhacopilum tomentosum* is known to occur in Louisiana and will probably be discovered in some other of our Southern States. It ranges throughout the West Indies also.

The Leskeaceae are divided into five subfamilies; the *Heterocladieae*, *Thelieae*, *Anomodontae*, *Leskeae* and *Thuidieae*. *Heterocladium* has five North American species; *H. procurrens*, *H. squarrosulum*, *H. heteropterum*, *H. Macounii* and *H. heteropteroides*. *Thelia* four; *Th. hirtella*, *Th. compacta*, *Th. robusta*, and *Th. asprella*, *Th. Lescurii* being reduced to the latter. *Myurella* three species; *M. julacea*, *M. tenerrima* and *M. gracillia*.

Anomodon, as given by Lesqx. and James, is divided into three genera with *Haplohymenium* Doz. and Molk. to include *H. triste* (Cesat.) Kindb. and *Anomodon* with five species; *A. apiculatus*, *A. minor*, *A. viticulosus*, *A. attenuatus* and *A. rostratus* and *Herpetineuron Toccoae* (Sull.) Cardot.

The *Leskeae* include *Lindbergia* with *L. brachyptera* and *L. Austini* (Sull.) Broth. *Leskea* has four species; *L. microcarpa*, *L. polycarpa*, *L. arenicola*, *L. gracilescens*. *Leskea nervosa* is transferred to *Leskeella* Limpr. and *L. tectorum* to *Pseudoleskeella*. *Lescurea* takes one species, *L. substriata*. *Pseudoleskea* has five species; *P. atrovirens*, *P. pallida*, *P. denudata*, and the variety *Holzingeri*, *P. rigescens* and *P. stenophylla*.

The *Thuidieae* are also subdivided more than usual, the genus *Rauia* Aust. being recognized for *R. scita*. *Thuidium erectum* has been overlooked as it was reduced to a synonym of *Th. delicatum* by Dr. Best in 1896. The genus *Haplocladium* C.M. is also maintained with two species, *H. virginianum* and *H. microphyllum* (Sw.) Broth. This part concludes with the generic description of *Claopodium* and figure of *C. leuconeuron*.

New York Botanical Garden.

A LIST OF MOSSES COLLECTED IN THE MOUNTAINS OF WESTERN NORTH CAROLINA IN THE SUMMER OF 1907.

By A. J. GROUT, PH.D.

All the mosses here listed were collected during July and the first two weeks in August. They were all collected in or near the estate of Geo. W. Vanderbilt, and mostly in Transylvania County, though some collected on and near Green Knob and Pigeon Gap were in Haywood Co. Chestnut Bald is the highest of the group of what is generally called "The Balsams," because the summits are covered with balsam fir and spruce. Probably some of the collections made here were over the line in Jackson County. All collections from Chestnut Bald were at about 6000 ft. altitude.

The Pink Beds, which were headquarters, is an elevated mountain valley about 3300 ft. above sea level on the average and about 12 miles north-west of Brevard and about 40 miles from Asheville. The life of these mountains, both animal and vegetable, is an interesting combination of northern and southern forms. Many forms found here which were originally identified with northern forms have proved on closer study to be well marked varieties or even distinct species. Many of the mosses listed here differ considerably from northern forms and are probably good varieties, to say the least. The thirteen fascicle (Nos. 301-325) of my "North American Musci

Pleurocarpi" is almost exclusively composed of specimens from this region and contains many of these interesting aberrant forms.

Undoubtedly some of the common mosses were omitted from my collections and from the list, as the collection of the commonest things was apt to be put off until some more convenient time. Fruiting *Polytrichum commune* was faithfully sought for but was not encountered and all sterile specimens collected proved to be something else. The abundant rains and moist climate of this region make it an excellent locality for mosses and the number of these plants is almost equal to that in our northern mountains, but it seemed to me that the number of species was far less.

In a given locality the soil for many rods would appear covered with mosses but on investigation there seemed to be far less variety than in a similar area in the north.

My visit to this region was made possible and comfortable through the kindness of Dr. Clifton D. Howe, Assistant Director of the Biltmore School of Forestry, which holds its summer sessions in the Pink Beds.

I found the climate in the region delightful except for the almost daily thunder shower, but the extent of my collections was materially lessened by lack of strength to undergo any very strenuous trips into the numerous wild and attractive regions beyond easy access.

SPHAGNUM DILL. Peat bogs are rare in this region but in the bottom of the Pink Beds valley there were bogs containing three or four species, which unfortunately were not collected.

ANDREAEA CRASSINERVIA Bruch, cfr. Bare cliffs, summit of Chestnut Bald.

" Rothii, W. & M. With the last. Possibly the entire collection is this species.

GEORGIA PELLUCIDA (L.) Rabenh. Common.

CATHARINEA ANGUSTATA Brid. Common.

" UNDULATA (L.) W. & M. Collected only once at the summit of Chestnut Bald and apparently infrequent.

POGONATUM BREVICAULE (Brid.) Beauv. Pink Beds. No specimens preserved.

POLYTRICHUM OHIOENSE R. & C. Common everywhere in the region.

" GRACILE Dicks. Summit of Chestnut Bald.

WEBERA SESSILIS (Schmid.) Lindb. Common.

FISSIDENS ADIANTIODES (L.) Hedw. Collected in the Pink Beds.

" CRISTATUS Wils. Frequent.

" SUBBASILARIS Hedw. Very common on bark of trees.

LEUCOBRYUM GLAUCUM (L.) Schimp. Collected in the Pink Beds. No specimens preserved.

CAMPYLOPUS INTROFLEXUS (Hedw.) Brid. On bare cliffs, summit of Chestnut Bald.

" VIRGINICUS (Aust.) L. & J. Same as the last but in more moist situations.

CAMPYLOSTELIUM SAXICOLA (Web. & Mohr.) B. & S. On stone, Pink Beds.

CERATODON PURPUREUS (L.) Brid. No specimen preserved.

DICRANELLA HETEROMALLA (L.) Schimp. Frequent. On the mountain summits the form with strongly recurved setae described by Mrs. Britton in Bulletin Torr. Bot. Club. Nov. 1895, is common.

DICRANUM BONJEANI DeNot. Edges of cliffs, Chestnut Bald. Back of leaf with serrate lamellae.

DICRANUM FLAGELLARE Hedw. Common.

“ FULVUM Hook. Common.

“ FUSCESCENS Turn. On rotten wood, summit of Chestnut Bald.

“ LONGIFOLIUM Ehrh. Common on the higher peaks.

“ SCOPARIUM (L.) Hedw. Common.

DITRICHUM TORTILE var. VAGINANS (Sulliv.) Grout. A peculiar form having denticulate leaves with margins strongly but narrowly revolute, somewhat curved capsules, very large double annulus and nearly smooth peristome teeth. Spores maturing in early autumn. Pink Beds.

ONCOPHORUS WALENBERGII Brid. Pink Beds.

RHABDOWEISIA DENTICULATA (Brid.) B. & S. Near Green Knob, alt. 5000 ft.

GRIMMIA APOCARPA (L.) Hedw. Pink Beds. No specimen preserved.

“ PENNSYLVANICA Schwaegr. Frequent.

HEDWIGIA ALBICANS (Web.) Lindb. Common.

PTYCOMITRIUM INCURVUM (Schwaegr.) Sulliv. Pigeon Gap.

GYMNOSTOMUM CURVIROSTRE (Ehrh.) Hedw. Cliffs, summit of Chestnut Bald.

TORTELLA CAESPITOSA (Schwaegr.) Limpr. Common at base of trees.

TRICHOSTOMUM CYLINDRICUM (Bruch.) Lindb. Abundant at summit of Chestnut Bald.

WEISIA VIRIDULA (L.) Hedw. Green Knob, alt. 5000 ft.

DRUMMONDIA CLAVELLATA Hook. Pigeon Gap.

ULOTA AMERICANA (Beauv.) Lindb. Common.

“ CRISPA Brid. Chestnut Bald.

“ “ var. CRISPULA (Bruch.) Hammar. Pink Beds.

“ LUDWIGII Brid. Pink Beds.

ZYGODON CONOIDEUS (Dicks.) Hook. With the next. Determination somewhat doubtful.

“ EXCÆLSUS (Sulliv.) E. G. B. Very common on bark of small trees, Chestnut Bald.

“ GRACILIS Wils. Very abundant on ledges, summit of Chestnut Bald. Determination doubtful.

FUNARIA HYGROMETRICA (L.) Sibth. Common.

AULACOMNIUM HETEROSTICHUM (Hedw.) B. & S. Memory says common in Pink Beds but no other record.

“ PALUSTRE Schwaegr. Much less common than in the north. Pink Beds.

BARTRAMIA OEDERI (Gunn.) Schwartz. Pink Beds.

“ POMIFORMIS (L.) Hedw. Common.

- PHILONOTIS FONTANA Brid. Pink Beds. A form collected around a cool spring under overhanging rocks agrees very closely with descriptions of var. *ampliretis* Dixon.
- BRYUM ARGENTEUM L. Common in its usual habitats.
- “ BIMUM Schreb. Pink Beds.
- “ CAPILLARE L. Pigeon Gap, alt. 4500 ft.
- MNIUM AFFINE var. RUGICUM B. & S. Moist rocks. Pink Beds.
- “ “ “ CILIARE (Grev.) C. M. Common.
- “ CUSPIDATUM (L.) Leyss. Pink Beds.
- “ HORNUM L. Frequent.
- “ PUNCTATUM L. Pink Beds.
- “ “ var. ELATUM Schimp. Pink Beds.
- “ ROSTRATUM Schrad. Pink Beds.
- POHLIA ELONGATA Hedw. Common in woods along the mountain summits.
- “ NUTANS (Schreb.) Lindb. Common. Specimens from Chestnut Bald had the terminal leaves infolded into a body appearing like a cleistocarpous capsule but which proved to be filled with minute round worms. See article this issue by H. N. Dixon.
- RHODOBRYUM ROSEUM (Weis.) Limpr. Common.
- ANOMODON APICULATUS B. & S. Pink Beds.
- “ ATTENUATUS (Schreb.) Huebn. Common.
- “ ROSTRATUS (Hedw.) Schimp. Common.
- “ TRISTIS (Cesat.) Sulliv. Pink Beds.
- LESKEA DENTICULATA Sulliv. Crevices of moist ledges, Pigeon Gap, alt. 4500 ft.
- THUIDIUM DELICATULUM (L.) Mitt. Very common.
- “ MICROPHYLLUM (Sw.) Best. Near Green Knob, alt. 5000 ft.
- “ RECOGNITUM (Hedw.) Lindb. Pink Beds.
- “ SCITUM (Beauv.) Aust. Pink Beds.
- “ VIRGINIANUM (Brid.) Lindb. Common.
- AMBLYSTEGIUM ADNATUM (Hedw.) J. & S. On rocks near Green Knob, alt. 5000 ft.
- “ IRRIGUUM (Hook. & Wils.) B. & S. Pink Beds.
- “ LESCURI (Sulliv.) Aust. Common in brooks.
- “ VARIUM (Hedw.) Lindb. forma. Base of trees. Pink Beds.
- BRACHYTHECIUM ACUMINATUM (Hedw.) Kindb. Common on trees. Pink Beds.
- “ CYRTOPHYLLUM Kindb. On trees. Pink Beds.
- “ DIGASTRUM Kindb. On moist rocks, Green Knob, alt. 5000 ft.
- “ OXYCLADON (Brid.) J. & S. Frequent on moist soil and rocks.
- “ OXYCLADON DENTATUM (L. & J.) Grout. On moist rocks near Green Knob, alt. 5000 ft. This var. here plainly merged into forms indistinguishable from *B. digastrum*.

- BRACHYTHECIUM OXYCLADON var.? On the bark of trees at the summit of Chestnut Bald with *Neckera pennata* and *Pylaisia velutina* grows a very slender form of this species unlike anything I have ever seen elsewhere.
- “ PLUMOSUM (Sw.) B. & S. Frequent.
- “ RIVULARE B. & S. Common.
- “ SALEBROSUM (Hoffm.) B. & S. Pink Beds.
- BRYHNIA NOVAE-ANGLIAE (Sulliv. & Lesq.) Grout. Pink Beds, Chestnut Bald. Rather more slender than the usual northern form.
- “ “ **fontinalis** var. nov. Very slender and attenuate with leaves distant. (N. Am. Musci Pleurocarpi, No. 315). Around cool spring under overhanging rocks Pink Beds, alt. 3500 ft.
- CAMPYLUM CHRYSOPHYLLUM (Brid.) Bryhn. Common but varying greatly, and with forms unlike any northern plant I am familiar with.
- The most typical plant was from the summit of Chestnut Bald. The form most unlike anything else I have seen was fairly common on moist soil in the Pink Beds, and I have called it.
- CAMPYLUM CHRYSOPHYLLUM **Carolinianum** var. nov. Very robust; leaves more gradually and less slenderly acuminate, often serrulate to apex.
- CAMPYLUM HISPIDULUM (Brid.) Mitten. Pink Beds.
- ENTODON BREVISETUS (Hook. & Wils.) J. & S. Frequent.
- “ CLADORRHIZANS (Hedw.) C. M. Pink Beds.
- “ SULLIVANTII C. M. Frequent on rocks in woods. Pink Beds.
- EURHYNCHIUM HIAN (Hedw.) J. & S. Pink Beds.
- “ RUSCIFORME (Neck.) Milde. Pink Beds.
- “ SERRULATUM (Hedw.) Kindb. Frequent.
- HOMALOTHECIELLA SUBCAPILLATA (Hedw.) Cardot. Pink Beds, Chestnut Bald.
- HYLOCOMIUM BREVIROSTRE (Ehrh.) B. & S. Near Green Knob, alt. 5000 ft.
- “ PROLIFERUM (L.) Lindb. Abundant on the summit of Chestnut Bald.
- “ TRIQUETRUM (L.) B. & S. Summit of Chestnut Bald.
- “ PROLIFERUM (L.) Lindb. Exceedingly abundant on the summit of Chestnut Bald.
- “ TRIQUETRUM (L.) B. & S. Chestnut Bald.
- HYPNUM ADUNCUM Hedw. (Group typicum) var. PSEUDOSENDTNERI Ren.* forma MINUTA. Det. Renauld. “A curious form evidently accidental or abnormal.” M. Renauld adds that the costa

*I am not certain from M. Renauld's letter whether this variety has been published before or not.

is too short for *H. Sendtneri* to which I had referred it and which it resembles in the structure of its alar cells. I am of the opinion that this is not an infrequent form in the region. Growing on moist soil by roadside. Pink Beds. The only *Harpidium* I could find in the region.

- HYPNUM CRISTA-CASTRENSIS L. Abundant on Chestnut Bald.
 “ CURVIFOLIUM Hedw. Common but with very long setae.
 “ EUGYRIUM B. & S. approaching var. *Mackayi* Schimp. Pink Beds.
 “ IMPONENS Hedw. Exceedingly common on rotten wood.
 “ MOLLUSCUM Hedw. Pink Beds.
 “ NEMOROSUM Koch. Chestnut Bald.
 “ PALLESCENS (Hedw.) B. & S. Chestnut Bald.
 “ REPTILE Mx. Pink Beds, Chestnut Bald.
- PLAGIOTHECIUM DENTICULATUM (L.) B. & S. Common.
 “ ELEGANS (Hook.) Sulliv. Bed of rivulet, Chestnut Bald.
 “ MUELLERIANUM Sch. Frequent and often growing at base of trees.
 “ STRIATELLUM (Huds.) B. & S. A very robust form with leaves 2 mm. long was found in moist crevices of rock near Green Knob, alt. 5000 ft.
- PTATYGRIUM REPENS (Brid.) B. & S. Pink Beds.
- PYLAISIA INTRICATA (Hedw.) Cardot. (*P. velutina* B. & S.). Common on trees, Chestnut Bald.
 “ SCHIMPERI Cardot. Common.
 “ SUBDENTICULATA Schimp. On bark of trees, Pink Beds, Chestnut Bald.
- RAPHIDOSTEGIUM CAROLINIANUM (C.M.) J. & S. Bare cliffs, Chestnut Bald.
 “ CYLINDRICARPUM (C. M.) J. & S. Bark of tree in swamp, Pink Beds.
 “ DELICATULUM (James) Paris. On rotten wood, summit of Chestnut Bald.
 “ MARYLANDICUM (C. M.) J. & S. Wet rocks by brook, Pink Beds.
 “ NOVAE-CESAREAE (Aust.) R. & C. On moist rocks near brook, Pink Beds.
 “ RECURVANS (Mx.) B. & S. Common. On Chestnut Bald were some exceedingly interesting forms that merit more careful study than I have yet been able to give.
- ANACAMPTODON SPLACHNOIDES (Froelich.) Brid. On decaying spot on upper side of horizontal oak limb, Pigeon Gap, alt. 4500 ft.
- HOOKEA SULLIVANTII C. M. Common along the banks of brooks close to the water.
- NECKERA PENNATA (L.) Hedw. Summit of Chestnut Bald.
 LEPTODON TRICHOMITRION (Hedw.) Mohr. Common.
 LEUCODON BRACHYPUS Brid. Very common.
 FONTINALIS DALECARLICA B. & S. Pink Beds.
 “ NOVAE-ANGLIAE Sulliv. Pink Beds.

Boys' High School, Brooklyn, N. Y.

(Reprinted from the Journal of Botany, September, 1905.)

NEMATODE GALLS ON MOSSES.

By H. N. DIXON, M.A., F.L.S.

When recently examining specimens of *Porotrichum alopecurum* Mitt., gathered in 1894 at Becky Fall, Lustleigh, South Devon, I was struck by what appeared to be terminal male flowers on the tips of the secondary branches and branchlets, forming hard, yellow, tumid, bud-like bodies, on some plants very numerous and conspicuous; in one case I counted as many as fifty on a single stem. The apical position, as well as the fact that the stems were fruiting ones (the species being dioicous) of course precluded the idea that they were male flowers, and on dissection they proved to be bodies of a gall-like nature, containing numerous minute Nematode worms, or *Anguillulæ*.

Galls of this nature appear to be very uncommon on mosses—I have only once come across them elsewhere among the many thousands of specimens that have passed through my hands in the last twenty years or more: they have recently been described in two papers in *Hedwigia*, for the references to which I am indebted to Mr. A. Gepp. Mönkemeyer published a short article (*Hedwigia*, xli. Beiblatt 22, 1902) on “*Hypnum fluitans* L. mit Anguillulagallen;” and again, within the last few weeks, a more detailed article has appeared by Schiffner (*Hedwigia*, xlv. 218, 1905), “Beobachtungen über Nematoden-Gallen bei Laubmoosen.” The former writer describes similar galls on *H. fluitans*, and refers to their occurrence on other *Harpidia*, as noted by Warnstorf, especially on *H. aduncum* Hedw. Schiffner adds considerably to the number of species of moss acting as host-plant to the galls, having found them on several species of *Dicranum*, and, what is curious, most of these occurred in quite dry stations, instead of in the aquatic or moist situations which are the usual habitat for these *Anguillulidæ*. He also detected them on *H. cupressiforme*, where they occurred at the apex of the branches; and he points out that this effectually disposes of the supposition that the galls might originate from male flowers, modified by the infection of the *Anguillula*. This conclusion is entirely confirmed by the case of the *Porotrichum* now recorded, where the galls all occur at the apex of the ultimate branchlets, where flowers are never produced.

In all probability the Nematode is the same in all these galls, as Schiffner found them to be the same on the various species of *Dicranum*, etc., from which he obtained them; and Mönkemeyer's figures of those in the galls of *H. fluitans* exactly recall those which I obtained from *Porotrichum alopecurum*. Moreover, his description of the alteration in structure produced in the leaves composing the gall in *H. fluitans* agrees exactly with my own observations.

I have on only one other occasion observed anything in the nature of a gall on a moss, *viz.* on a specimen of *Eurhynchium Swartzii* Hobk., gathered in a ditch in Yardley Chase, Northamptonshire, in 1887. The nature of the gall remained at the time undetermined, and the moss was put on one side; but recent examination in the light of the facts described above shows the contents of the galls to be similar, and *Eurhynchium* must be added to the list of those genera already known to be infested by the *Anguillulæ*.

HELPFUL LITERATURE FOR STUDENTS OF NORTH AMERICAN HEPATICAE.

CAROLINE COVENTRY HAYNES.

Having been asked to give a list of books and pamphlets that I find most useful in the study of hepatics, I have prepared the following. It may appear long but the fact of there being no up-to-date manual obliges one to consult many authorities in order to comprehend our North American flora.

Among Dr. A. W. Evans' publications are the following, bearing directly upon this flora:

"A Revision of the North American Species of *Frullania*." Trans. Conn. Acad. Vol. X. May, 1897.

"The Lejeuneae of the United States and Canada." Mem. Torrey Club, Vol. 8. No. 2, 1902.

"Notes on the North American Species of *Plagiochila*." Bot. Gaz. Vol. 21. April, 1896.

"*Odontoschisma Macounii* and its North American Allies." Bot. Gaz. Vol. 36. Nov. 1903.

"A New Hepatic from the Eastern United States." Bot. Gaz. Vol. 34. Nov. 1902. (*Diplophyllia apiculata* Evans).

"Notes on New England Hepaticae" have appeared from time to time in RHODORA. Dates of publications as follows: Nov. 1902, Aug. 1904, Sept. 1904, March, 1905, Feb. 1906, and March, 1907. These are critical notes.

"List of New England Plants, -- Hepaticae" appeared in RHODORA, June, 1903.

"Studies Among our Common Hepaticae" came out in THE PLANT WORLD as follows: Vol. I. No. 7, April, 1898; Vol. I. No. 9, June, 1898; Vol. I. No. 12, Sept. 1898; Vol. II. No. 5, February, 1899. These deal with four species and are beautiful models of the correct way of taking up the study.

The works of Dr. Marshall A. Howe on the Hepaticae are also of the first importance:

"Hepaticae and Anthocerotae of California." Mem. Torrey Club, Vol. 7, 1899.

"North American Species of *Porella*." Contributions from the Depart. Bot. Col. Univ. No. 126, 1897.

"New American Hepaticae." Bull. Torrey Club, Vol. 25, No. 4, April, 1898. (*Scapania heterophylla* and *Riccia trichocarpa*).

"Notes on Californian Bryophytes" appeared in ERYTHEA, Vol. II. No. 6, June, 1894. Vol. IV. No. 3, March, 1896. Vol. V. No. 8, Aug. 1897.

Dr. Lucian M. Underwood's pioneer work is also of great interest and value:

"Descriptive Catalogue of the North American Hepaticae, North of Mexico." Bull. Illinois State Laboratory, Vol. II. 1884. Gives 231 species.

"Notes on our Hepaticae." No. 1. Northern Species, Bot. Gaz. 14: 1889. No. 2. The Genus *Riccia*, Bot. Gaz. 19: 1894. No. 3. The Distribution of the North American Marchantiaceae, Bot. Gaz. 21: 1896. No. 4. The Genus *Fossombronina*, Bot. Gaz. 21: 1896.

"In Gray's Manual," Sixth Edition, 1890, the Hepaticae were elaborated by Dr. Underwood and give 144 species. This list needs revision and many additions.

Below we give several good reference books that are generally to be found in University and Botanical libraries:

Stephani, "Species Hepaticarum" which is being published in Bull. de l'Herbier Boissier.

Schiffner, in "Engler and Prantl, Die Natürlichen Pflanzenfamilien," gives the sequence of genera usually followed.

"Synopsis Hepaticarum," by Gottsche, Lindenberg and Nees, 1844.

Karl Müller is publishing a comprehensive work in Rabenhorst's "Kryptogamen-flora von Deutschland, Oesterreich, etc." Vol. 6.

"Monographie der Lebermoosgattung Scapania Dum." by Karl Müller.

"Kryptogamenflora der Mark Brandenburg, Leber und Torfmoose," by C. Warnstorf.

"On Cephalozia" by Richard Spruce.

"Hepaticae of the British Isles," by Pearson.

"Contributions to the Biology of the Hepaticae," by F. Cavers. England, 1904.

"Hepatics of the British Islands," by Canon Henry Wm. Lett.

"A Revised Key to the Hepatics of the British Islands," by Symers M. Macvicar.

"Mosses with a Hand-Lens." Second Edition, Including the Hepatics.
A. J. Grout. New York City.

ALNUS OREGANA AS CRYPTOGAMIC HOST.

A. S. FOSTER.

When the virgin forest of the Lower Columbia Region is removed, Nature, in her efforts at reforesting, covers the ground the first season with thistles and fireweed, and brambles, ferns and mosses, especially if the area has been burned over, play their part in reclaiming the territory. But in two or three years the western alder, *Alnus Oregona*, has sown its seeds everywhere, and the following year the tract becomes an alder thicket. Indeed it has already occupied the swampy places, as it does not object to "wet feet" and may have been an under-shrub, which is now able to lift its head above its neighbors and ready to encroach upon the hemlocks and spruces. This alder seems hardy, but seldom lives to any great age, because it cannot overtop the lofty spruce.

In its younger stages, the smooth, clean bark of the alder makes an excellent place of lodgement for the spores of lichens. When only five or six years old—a mere pole—it begins to show the markings of the thalloid forms, some of which in their juvenile stages are not unlike the work of a rodent. Almost every part of the trunk becomes encrusted with thalli giving to a young grove a mottled appearance.

Various mosses also, of the same species nearly that Dr. Bailey enumerates as growing on the large-leaved maple (See BRYOLOGIST 6:3, 1903), may

be colonized on the trunk and limbs of the alder. That ubiquitous and "comfortable polypody," *Polypodium occidentale*, is sure to be in evidence if it can find lodgement anywhere. Indeed it appears that *Porella navicularis* offers protection to its creeping stems; sometimes it will intrude upon *Frullania Nisquallensis*, whose reddish woven mats give a pretty relief to the green of the polypody, and this may be set off by some fulvous-green hepatic.

By the time the alder is twenty inches in diameter, and about twenty years old, the entire trunk is preëmpted by some form of moss, hepatic or lichen. The first, no doubt, to claim attention will be *Graphis scripta*, in quaint characters not unlike an Assyrian inscription, riddles for a naturalist to decipher. *Lecanora pallida* and *L. subfusca*, whose apothecia show white and black by contrast, are suggestive of a new pattern of polka-dot. *Lecanora orosthea* is not abundant. *Thelotrema lepadinum* and *Th. leprocarpum* are truly leprous in appearance, and in contrast with them *Placidium cerinum* claims attention. Just out of reach are some bronze spots, *Parmelia olivacea*, and near by, with its coppery-green, finely corrugated thallus, is *Parmelia pertusa*. Some gray bits in low relief are *Parmelia saxatilis* with its characteristic branching. These may be easily removed with a sharp jack-knife, but care must be taken to cut away some of the epidermis and to put them to press immediately. Covering the roots of the tree are *Plagiothecium elegans* and *Hylocomium loreum*.

Let us climb the tree on a wet day, for then must one gather his lichens or spoil many a fine specimen. *Evernia prunastri* gives out a strong scent of iodine, while you observe that the older parts are greenish, due probably to an alga, an alien. Near by is another ramulous plant, grayish, with soredia along the edges of the fronds, *Ramalina farinacea*. Farther inland, about the city of Portland, *Ramalina ciliaris* is found on the maple. That delicate waxy-white thing is *Ramalina Menziesii*. Had Menzies ever seen it he must have admired it. You break off a dead limb; on it is a miniature forest of *Sphaerophorus globiferus*, which behaves somewhat like the Cladonias; it is slow-growing and does not reproduce until several years old. On a larger branch within reach is a modest Quaker in her soft-gray suit of slight pinkish tinge—is it gros grain silk? She belongs to, one of the aristocratic families, *Cetraria lacunosa*, so you will carefully remove this rare beauty. *Cetraria ciliaris* is occasionally found on the alder, but it seems to prefer higher timber like the spruce. The same is true of *Parmelia physodes*, and yet the juvenile forms are often seen on the lower parts of our trees.

On the twigs may be found *Physcia stellaris*, an interesting little thing whose apothecia do remind one of the stars. While in pursuit of this, the writer found a form of *Parmelia olivacea* to which Mr. G. K. Merrill has tentatively given the varietal name *imparispora*. *Physcia hispida* is abundant and with *Theloschistes lychnus* prefers trees standing apart, indeed the twigs of an old pear-tree in a yard were so densely covered with these last three forms that there was scarcely room for the buds. These Usneas

are lodged, windcast, on the limbs of the alder: *Usnea barbata hirta* prefers a tree in swampy places, but *U. barbata ceratina* is found on the upland stretches. *Sticta pulmonaria* and *S. Oregana* are often found lodged on the alder, but their juvenile life was spent on the maple. As you climb higher on the tree you may notice the abrasions of *Arthonia asteroides*, which might be mistaken for the natural color of the inner bark. Low down where moss has not obtruded the hand lens reveals several other greenish or yellowish, granular forms, among which are brown grains of dust apparently some of the lower forms of life.

Of course not all of the above lichens were found on any one tree, but at least one half of them were so found, and all were found on the alder within a radius of one-half mile in the vicinity of Cathlamet. Washington.

The coastal region about the estuary of the Columbia River belongs to the humid zone, having an oceanic climate. The southwest winds, carrying heavy loads of moisture from the warmer areas of the Pacific, drop this load as they pass inland and ascend the western slopes of the Cascade Mts., giving a rain fall of 70-90 inches yearly. These warm Chinook winds mitigate the rigors of the winter season and moderate the heat of summer, thus producing in Lat. 46° N. a mild and humid climate with prolonged season of growth very conducive to such plants as ferns, mosses, hepatics and lichens, not to mention the numerous forms of fungi and algae.

Portland, Oregon, June 10, 1907.

NOTE.—The writer is under obligation to Mr. G. K. Merrill, Rockland, Maine, for the determination of the above mentioned lichens, specimens of which are in his herbarium and in that of the Sullivant Moss Chapter, and duplicate specimens in that of the writer.

LICHENS OF THE MOUNT MONADNOCK REGION, N. H.

REGINALD HEBER HOWE, JR.

In the American Naturalist for September, 1906 (Vol. XL., No. 447, pp., 661-665), I published a list of seventy-one species of lichens that I had collected on or about Mt. Monadnock. Since then I have had several opportunities to study the lichens of this region, and there has also come into my care as curator of the Thoreau Museum of Natural History at the Middlesex School, Concord, Massachusetts, a large and interesting collection of lichens collected about Keene, N. H., and on Mt. Monadnock. This collection was made by George Alexander Wheelock during the 70's (1877-1880), one volume of specimens is labelled 1877, another 1876-80.

Mr. Wheelock was born in Winchester, N. H., January 21, 1816, and spent almost his entire life in studying the natural history of Keene, N. H. He died June 17, 1906, in Keene. He was what might be called a jack-daw collector of natural history specimens, and his varied collections and scientific books are now installed in this Museum. In Cassino's Naturalist's Directory for 1884, Mr. Wheelock is included among the Cryptogamic Botanists and Entomologists.

The present list is based on his collection. New species added to the original list are numbered in bold faced type. All matter enclosed in parenthesis is based on further collecting and study on my own part since the first list appeared.

The specimens in the Wheelock collection were evidently mainly determined by Mr. Wheelock, and in the large majority of cases correctly, though many curious and glaring errors are to be noticed. His library contains the works of Tuckerman,* and he followed this author in almost every respect. It is not improbable, as he occasionally visited Amherst, and was a contemporary of Tuckerman, that many of his determinations had the approval of this great lichenologist, though of this we have no absolute proof. The herbarium is accessible to all who desire to consult it. Separates of this paper may be had by applying to the author.

It is the desire of the donors, Mr. W. H. Elliot, Dr. J. W. Elliot, and Mrs. E. J. E. Daland, relatives of Mr. Wheelock, that "The George Alexander Wheelock Collection" be of educational use in accordance with the custom of Mr. Wheelock during his life, in the quiet tuition of the children of Keene. The genus *Cladonia* is now in the hands of Dr. L. Scriba, and various genera including *Lecanora*, etc. have been sent to Dr. H. E. Hasse, of California. Grateful acknowledgements is due to both these gentlemen.

Annotated List.

GENUS: RAMALINA ACH., DE NOT.

The genus *Ramalina* as represented in this region needs an entire revision, and the above arrangement and disposal of species and specimens must be considered only temporary. I will gladly send the specimens contained in the Wheelock and my Herbarium to any person who is familiar with the genus.

1. *RAMALINA CALICARIS FRAXINEA* Fr. Three specimens, two thus labelled. Fertile. One is extremely large for this region thallus measuring: $1.85 \times .30$ inches, suggesting its accidental appearance in the collection. (Fitzwilliam, Jan. 1906, on maple, not typical, *subamplica* Nyl).

2. *RAMALINA CALICARIS FASTIGIATA* Fr. Three specimens. Fertile. (Fitzwilliam, common).

3. *RAMALINA CALICARIS CANALICULATA* Fr. Four specimens of which one specimen, thus labelled, was first labelled *pollinaria*, and is undeveloped, and indeterminate, though approaching *fraxinea*.

4. *RAMALINA CALICARIS FARINACEA* Schær. Three specimens, one specimen mixed with *pollinaria*, and so labelled.

5. *RAMALINA PUSILLAGENICULATA* Tuckerm. = (*R. minuscula* Nyl.). Two specimens unlabelled appear to belong here.

6. *RAMALINA POLLINARIA* (Ach.) Tuckerm. Five specimens, four thus labelled, one collected on "Huggin's hill." (See above, No. 3).

7. *RAMALINA POLYMORPHA* (Ach.) Tuckerm. Three specimens, one thus

*Including a written copy of "Synopsis of Lichens copied from Tuckerman in the Harvard Library."

labelled, and another labelled *R. pusilla geniculata* Tuckerm. undoubtedly belong here.

The collection also contains one specimen of *Ramalina reticulata* (Noelh.) Krempelh. from California, two fruited specimens unidentified of *Ramalina rigida* Pers. from Nantucket, one specimen of *Ramalina ceruchis* (Ach.) DeNot (?) from Fayal, Azores, and one specimen, *Ramilina Menziesii* Tuck., from Oregon.

GENUS: CETRARIA (ACH.) FR., MULL.

8. CETRARIA ISLANDICA (L.) Ach. Three specimens. One from "Monadnoc," and another labelled "rare." Sterile.

9. CETRARIA ALEURITES (Ach.) Th. Fr. Nine specimens. Two fertile. One labelled *Parmelia aleurites*, and one undetermined; of three also labelled "*P. placordia*" Nyl. two belong here—one is *P. tiliacea* (Hoffm.) Floerk.

10. CETRARIA CILIARIS (Ach.) Tuckerm. Seven specimens, all fertile. Three undetermined, and one distinctly ciliate, labelled *lacunosa*. (Fitzwilliam, common).

11. CETRARIA SAEPINCOLA (Ehrh.) Ach. Two fertile specimens, both labelled *sepincola*. One intermixed with *C. j. Pinastri*, labelled *prunastri*.

12. CETRARIA LACUNOSA Ach. Five fertile specimens. Two are labelled var. *Atlantica*, a form described by Tuckerman in his "A Synopsis of Lichens of New England," etc., Cambridge, 1846, p. 16, but not recognized in his Synopsis of 1882, Part I. One specimen is labelled v. *stenophylla*, which it undoubtedly is not, being however, peculiar in that the margins of the apothecal cups are crenulate. (Fitzwilliam, common).

13. CETRARIA GLAUCA (L.) Ach. One specimen, thus labelled, is wrongly determined, being *Nephroma levigatum parile* Nyl.

14. CETRARIA OAKESIANA Tuckerm. Two specimens. One fertile.

15. CETRARIA AURESCENS Tuckerm. One specimen. Fertile.

16. CETRARIA JUNIPERIANA PINASTRI ("Prunastri") Ach. Three sterile specimens, one labelled *Cetraria juniperina* (L.) Ach. "Keene, very rare," is however, the subspecies *Pinastri* Ach.; another labelled simply *Cetraria juniperina* is also the variety *Pinastri*. (See also under No. 12).

GENUS: EVERNIA ACH., MANN.

17. EVERNIA FURFURACEA (L.) Mann. Three specimens. Sterile. (Fitzwilliam, locally common).

18. EVERNIA PRUNASTRI (L.) Ach. Three specimens. Sterile. One was labelled "B. cladonia" but crossed out, evidently an early error, a misconception of *furfuracea*. (Fitzwilliam, not uncommon).

(This collection also contains four specimens of *Evernia vulpina* (L.) Ach., two at least from Lake Tahoe, Cal. All sterile.

GENUS: USNEA (DILL.) ACH.

19. USNEA BARBATA FLORIDA Fr. Two specimens. Fertile. (Abundant, Fitzwilliam).

20. *USNEA BARBATA FLORIDA* HIRTA Fr. Five specimens, three thus labelled. Sterile.

21. *USNEA BARBATA FLORIDA RUBIGINIA* Michx. Two specimens. Sterile. (Fitzwilliam, not uncommon).

22. *USNEA BARBATA FLORIDA STRIGOSA* Ach. (One specimen, Jan, 8, 1907. Fitzwilliam).

23. *USNEA BARBATA DASYPOGA* Fr. (Two specimens collected Jan. 1907, on spruce are of doubtful determination. Prof. B. Fink *in litt*, under date of Feb. 22, 1907, writes me, "The *Usnea* I think is *dasy-poga*.").

24. *USNEA ANGULATA* Ach. Two specimens. Sterile. One from example "9 ft. long."

25. *USNEA LONGISSIMA* Ach. Two specimens, from Tenant Swamp, Keene, labelled with the remark "9 ft. long."

GRNUS: *ALECTORIA* (ACH.) NYL.

26. *ALECTORIA JUBATA CHALYBEIFORMIS* Ach. Four specimens, one fertile. One is labelled *Evernia jubata chalybeiformis*. Two are unlabelled.

27. *ALECTORIA JUBATA IMPLEXIA* Fr. Two specimens. Fertile. Both labelled *Evernia jubata v. implexa*, the *Evernia* in one case written over with "*Alectoria*." (Fitzwilliam, locally not uncommon).

To be continued.

Concord, Mass.

OBITUARY.

Mr. T. W. Naylor Beckett, whom many of our readers have occasion to remember gratefully for his excellently prepared New Zealand mosses, died December 5, 1906, at his country seat near Fendalton, Christchurch, New Zealand, at the age of 68. He contracted influenza and despite every effort it developed into pneumonia. One of his sons writes under date of December 20, 1907: "I must ask your apologies for not writing sooner. Several months elapsed after his death settling his private affairs, and owing to the fact that I do not live at home, I have had no opportunity until recently of going through his moss correspondence which has been handed over to me by my brother. I regret that my brother and I are not sufficiently expert to carry on our father's work. He was a most industrious and enthusiastic worker and was never happier than when in his study surrounded by his mosses. At present his herbarium is just as he left it, but I hope that some day it may find a resting place in the Canterbury Museum, and so be of benefit to future botanists."

SULLIVANT MOSS CHAPTER NOTES.

NEW MEMBERS.—The revised list January 1st gave 172 members, since then we add the following: No. 173. Thomas Hebden, Esq., Cullingworth near Bradford, Yorkshire, England. No. 174. L. Scriba, 4 Hauptstrasse, Höchst am Main, Germany. No. 175. Mr. M. H. Whitehill, 605 South Broadway, Baltimore, Maryland. No. 176. Mr. William Torrey Barker, 53 Glen Road, Jamaica Plain, Mass. No. 177. Rev. Frederick W. Coleman,

The Parsonage, 131 Rock Street, Fall River, Mass. No. 178. Mr. Lincoln W. Riddle, 3 Waban Street, Wellesley, Mass. No. 179. Dr. G. F. Richardson, Mt. Pleasant, Mich. No. 180. E. R. Lake, Oregon State Agricultural College, Corvallis, Oregon.

Note the following changes of address: Prof. T. A. Bonser, Spokane College, Spokane, Wash.; Mr. A. S. Foster, Westport, Wash.; Miss E. B. Bryant, 1200 Commonwealth Avenue, Allston, Mass.

It is with great pleasure that we welcome again to active work, Miss Mary F. Miller, who served the Chapter so competently as secretary and custodian of the Moss herbarium, in 1904 and 1905. Miss Miller has consented to take charge of the Lichen Department, and to relieve Mr. Merrill of the burden of correspondence, determinations, and care of the herbarium. Mr. Merrill however most kindly promises his assistance when specimens require special study.

On page 8 of THE BRYOLOGIST for January, 1908, under Plate II. *Radula tenax* by Miss Lorenz, after the magnification figures it should read, "All reduced one-half."

REPORT OF THE LICHEN DEPARTMENT.

The Custodian of the Lichen Herbarium begs leave to submit a report. On Jan. 1, 1903, since which time there has been no tabular report of the herbarium contents, there were 170 specimens in the collection, comprising 95 species distributed in 27 genera. That portion of the herbarium in my custody now totals 457 specimens, 191 species and varieties in 45 genera. The Lichen collection as an entirety has not as yet been in my care, and the figures above given represent only an enumeration of the material actually in my hands. Thanks are due Messrs. A. S. Foster, T. A. Bonser, A. J. Hill, S. Rapp, C. C. Plitt, R. S. Gray, J. Macoun, Miss Mary F. Miller and Miss C. M. Carr, for contributions during the past year.

Respectfully submitted,

G. K. MERRILL.

OFFERINGS.

(To Chapter Members only. For postage).

Mr. A. S. Foster, Westport, Wash. *Tayloria serrata* B. & S. c. fr. Collected in Washington. (Through oversight this was omitted from the January issue).

Miss Mary F. Miller, 1109 M. Street, Washington, D. C. *Cladonia furcata* Schrad. m. *pinnata* Wainio, *Peltigera polydactyle* Hoffm., both collected in Shandaken, N. Y. *Evernia prunastri* Ach. forma *mollis* Merrill in litt. Collected in Vermont.

Mr. Severin Rapp, Sanford, Florida. *Hookeria varians* Sulliv., *Octoblepharum albidum* Hedw. Collected in Florida.

Mr. J. P. Naylor, Greencastle, Indiana. *Cirriphyllum Boscii* Grout c. fr. Collected in Putnam Co., Indiana.

Mr. George E. Nichols, Box 569, Yale Station, New Haven, Conn. *Hypnum molluscum* Hedw., st. *Fontinalis Dalecartica* B. & S., st. *Brachythecium rivulare* B. & S. c.fr. All collected in Connecticut,

Dr. J. F. Brenckle, Kulm, North Dakota. *Catharinaea undulata* W. & M., *Amblystegium adnatum* Aust., *Thuidium microphyllum* Best. All in fine fruit. Collected at Rugby Junction, Wisconsin.

Miss E. A. Warner, 78 Orange Street, Brooklyn, N. Y. *Isothecium Breweriaum* (Lesq.) Kindb., st. Collected by C. F. Baker, near Stanford University, Cal. Also a small quantity c.fr. collected by A. J. Hill, New Westminster, B. C. *Mnium insigne* Mitt. c.fr. Collected A. J. Hill, New Westminster, B. C. *Homalia Jamesii* Schimp., st. Collected by A. J. Grout, Newfane, Vermont.

Miss C. C. Haynes, 16 East 36th Street, New York City. *Microlejeunia lucens* (Tayl.) Evans. Collected by Mrs. E. C. Taylor in Georgia. *Frullania Asagrayana* Mont. Collected by Mr. G. E. Nichols in Connecticut.

FOR SALE.—A perfect copy of Sullivant's Supplement to Icones, for \$6.00. Carriage extra. Address, Prof. John M. Holzinger, Winona, Minn.

FOR SALE.—A set of fifty Tasmanian Mosses, labels written by the collector, for \$5.00. Address, Dr. Levier, 16 Via Jacopo da Diacceto, Florence, Italy.

FOR SALE.—Two thousand named and mounted plants, including Miss Cummings' Lichen Exsiccati, also series of ferns, mosses, grasses, etc. Address, Mrs. Amelia F. Eby, 141 North Duke Street, Lancaster, Pa.

WANTED.—Mr. Reginald Heber Howe, Jr., Thoreau Museum, Concord, Mass., asks that persons having in their herbaria specimens of *Parmelia caperata* (L.) Ach. in fruit, would give him the largest diameter expressed in millimeters (mm.) of the apothecia of New England specimens.

FOR SALE.—Volumes 4 to 10, complete, of THE BRYOLOGIST. Address Prof. W. W. Stockberger, U. S. Dept. of Agriculture, Washington, D. C.

WANTED.—There are several numbers of THE BRYOLOGIST very low, one gone entirely save for five sets which must be sold complete. Of these three sets have the first five volumes bound, the last five are unbound. All are held at the same price.

We make the suggestion that persons binding minus Vol. II, No. 4, Oct. 1899, insert blank pages to the number required and whenever they are obtained (by their being reprinted or otherwise) these could be cut out and the others pasted in.

A liberal price will be given for any copies of Vol. I, No. 1, Jan. 1808. Vol. I, No. 1, 1806. ALL of Vol. II, 1899, and Vol. III, No. 1, 1899.

Return to the EDITOR and PUBLISHER,
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MAY 1908



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICS AND LICHENS

EDITOR

ANNIE MORRILL SMITH

ASSOCIATE

ABEL JOEL GROUT, Ph.D.

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Yours sincerely
Lucien M. Underwood

THE BRYOLOGIST

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No. 3

LUCIEN MARCUS UNDERWOOD.

CAROLINE COVENTRY HAYNES.

The story of Professor Lucien M. Underwood's life has been well told elsewhere, the scope and power of his work has been estimated, and a complete list of his publications has been given. From Dr. Curtis' paper; A Biographical Sketch of Lucien Marcus Underwood,* I have taken the greater part of the facts here given.

Born October 26, 1853, in the town of New Woodstock, New York, Professor Underwood died at his home at Redding, Conn., November 16, 1907. His early life was spent on his father's farm; he went regularly to school until, at the age of eleven, he became one of the farm hands and could only attend the winter term at school and seminary. When seventeen he gained the scholarship and mathematical prizes. His passion for collecting was shown at an early age, and though he was obliged to walk three miles to school, he would carry material which he habitually provided for the use of the natural history class. Professor L. M. Coon (afterwards Judge Coon, of Oswego) suggested his going to college; determination was added to the suggestion through his reading Lyell's Principles of Geology and other works, and, in 1873, he entered Syracuse University. This followed a year or two of farming and lumbering by which he obtained the necessary funds. In 1875 he began forming an herbarium, ferns being his first choice. Geology and entomology were also favorite studies; his eloquence placed him among the orators of his college; he was also an able writer. He visited New York and saw the Centennial Exposition at Philadelphia in 1876.

After his graduation in 1877 he began teaching, showing marked ability in surmounting difficulties. Meanwhile he was working for the Master's degree which he gained in 1878 at Syracuse University. He taught natural science at Cazenovia Seminary for two years, during which time he completed his graduate work in geology. After a year's teaching at Hedding College, Illinois, he became professor of geology and botany at the Illinois Wesleyan University at Bloomington, where he remained during three busy years.

From 1882-1896 he was actively interested in the Hepaticae, his desire being to bring this greatly neglected group into notice and he unquestionably succeeded in doing so. The year 1884 saw the publication of his "Descriptive Catalogue of the North American Hepaticae, north of Mexico." With O. F. Cook, he issued *Hepaticae Americanae*, a series, unfinished, of exsiccatae, numbering two hundred. He prepared the section on the Hepaticae in Gray's Manual of Botany, sixth edition, published in 1890. Among a number of valuable papers may be mentioned "The Evolution of the

*Bull. Torrey Club 35: 1-12, 1908.

Hepaticae," and the first part of a projected work on the North American Hepaticae entitled, "Index Hepaticae, Part I—Bibliography." His collecting trips brought him in contact with many scientists; several organizations were promoted, largely through his efforts.

For seven years he was associated with Syracuse University, teaching a variety of subjects. He was made professor in 1886. In 1890 he secured a year's leave of absence and accepted the Morgan fellowship at Harvard University, where he studied, among other things, the Sullivant and Taylor collection of hepatics. A professorship of botany was offered him at De Pauw University, Greencastle, Indiana. During the four years of his stay he worked at his favorite subject, cryptogamic botany. He was a member of the original committee on nomenclature at the Rochester meeting and was a delegate to the International Botanical Congress at Genoa. While in Europe he met many fellow scientists and examined noted herbaria, for the further study of which he afterwards returned many times. In 1893 he wrote to Professor Britton proposing the beginning of a comprehensive work on North American Flora; the first title suggested was "Systematic Botany of North America." After a year at the Alabama Polytechnic Institute, teaching biology, he became professor of botany at Columbia University in July, 1896. From this date his original absorption in the ferns returned: he made many collecting trips to the tropics and wrote constantly. His masterly comprehension of this great group is shown in the papers published. Mention should be made also of his publications on entomology and the fungi, all undertaken with the intention of presenting these subjects to the students. His breadth of view, intense enthusiasm and single-heartedness made him a remarkable teacher and organizer, and many honors were shown him.

An influence, such as his, must be a widely spreading one, as the subjects which he did so much to bring out of obscurity become better known. Students who have come within his genial influence, who have been helped and inspired by his quick and illuminating facing of problems, indeed mourn his loss. The writer wishes to bear testimony with so many others to his generosity. She will never forget the delight of receiving a box containing forty specimens, labeled "Hepaticae Americanae," all that were left of his published series; this was at a time when she knew by sight barely a dozen species. He followed this by gifts of reprints of some of his hepatic literature. Two years ago he turned over for her study the material, mostly unidentified, that had accumulated in his possession since he worked upon this group. Specimens of these were to be prepared for the Herbarium of the New York Botanical Garden, and he suggested her issuing a sort of continuation of his exsiccatae with the material that existed in sufficient quantity; accordingly, the first issue of this, under the title "American Hepaticae," was distributed last summer. Among this heterogeneous material are some collections to be reported upon and duplicates returned; many possibilities of study are offered, new species and new facts of distribution will be brought out, and it is a really inspiring work that will require years to accomplish, with never failing gratitude to the one who suggested it.

It is good to revive the memory of Torrey Field Days when Professor Underwood went along; what spirited seeing and seeking! Will any one of those who were of the party of May 6, 1906, at Redding, with him as our host, ever forget that delightful day? The happy hunting grounds that he knew so well—where *Pellia epiphylla* was found fruiting riotously, and *Jubula Pennsylvanica* was growing in great pendulous masses on the wet, steep sides of the glen. Then the rest under the trees, partaking of the bountiful luncheon provided by Mrs. Underwood, the general feeling of friendliness, the bouyant life radiating from our host! It was indeed a red-letter day!

A life of such constancy to an ideal whose accomplishment means the development of so many fine faculties in himself, and the advancement of science in the world will make us forever treasure his memory.

New York City.

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We are indebted to the Torrey Bulletin for permission to reproduce the portrait of Dr. Underwood.

LOPHOLEJEUNEA MUELLERIANA IN FLORIDA.

ALEXANDER W. EVANS.

Several months ago Mr. Severin Rapp, of Sanford, Florida, had the kindness to send me a package of Hepaticae for determination, all collected in the vicinity of his home. Among them were two specimens of a *Lopholejeunea* (3 and 14), which should apparently be referred to *L. Muelleriana* (Gottsche) Schiffn., a species new to the United States. *L. Muelleriana* was originally described from material collected in Mexico and is now also known from several of the West Indian Islands and from South America, so that the extension of its range into Florida is by no means surprising. Both of Mr. Rapp's specimens grew on the bark of trees.

So far as their vegetative organs are concerned the plants from Florida agree closely with the specimens from Porto Rico which I have recently described and figured.¹ The perianth, however, shows a greater development of paraphyllia or laciniae on the surface and indicates that this organ exhibits an even wider range of variability than had been supposed. In my description of the perianth the surface (leaving out of consideration the laciniae along the four sharp keels) is said to be smooth except for the occasional presence of a few scattered paraphyllia on the postical aspect, the implication being that such paraphyllia are frequently absent altogether. In the specimens from Sanford the paraphyllia are apparently always present and occur on both surfaces. Those on the antical surface tend to be arranged in a median longitudinal row, perhaps marking the position of a rudimentary antical keel. Those on the postical surface show a similar tendency to be arranged in three longitudinal rows, one lying between the two angles of the postical keel and the two others in the strongly flattened portions of the perianth between the postical and lateral keels. On some perianths one or two of these rows may be very indistinct or absent altogether, and there are often a few scattered paraphyllia on each surface in addition to those in rows. The presence of antical paraphyllia had not been suspected from the study of Porto Rican specimens of *L. Muelleriana*, and I find upon examining them again that the antical surface of the perianth is perfectly smooth in the majority of cases. Occasionally, however, one or two paraphyllia may be detected in this position. In the Brazilian specimens distributed by Spruce the paraphyllia are better developed and sometimes form as distinct an antical row as in the specimens from Florida. In accordance with these new observations the description of the surface of the perianth should be emended as follows: antical surface sometimes bearing an interrupted median row of paraphyllia similar to the laciniae of the keels; postical surface sometimes bearing from one to three similar rows of paraphyllia; both surfaces otherwise smooth except for the occasional presence of a few scattered paraphyllia. In the Sanford specimens the lobules of the perichaetial bracts are distinct and usually acute or apiculate at the apex, a condition which is only occasionally to be observed in material from tropical America.

¹ Bull. Torrey Club 34: 27. pl. 4, f. 1-8. 1907.

Lopholejeunea Muelleriana is the twenty-ninth species of the Lejeuneae to be recorded for the United States and the twenty-fourth for Florida. With regard to this particular group of Hepaticae Florida stands far in advance of the other states of the Union, Louisiana coming second with only nine species. This condition is of course to be explained by the subtropical climate of Florida and its close proximity to the West Indies, where the Lejeuneae reach a high degree of development. Of the twenty-four species so far recorded three are apparently endemic and nine are tropical American species which have not yet been detected in the United States beyond the limits of Florida. The remaining twelve species are mostly of wide distribution.

Yale University.

HELPFUL HEPATIC LITERATURE.

Attention has been called to an omission from Miss Haynes' "Helpful Literature for Students of North American Hepaticae," Bry. Vol. XI, No. 2, p. 32, namely "Keys to the Liverworts recognized in the 6th Ed. of Gray's Manual of Botany," by Edo Claassen. Published in The Ohio Naturalist. Vol. V, No. 6; Vol. VI, No. 6 (a correction of the former); Vol. VI, No. 7, and Vol. VII, No. 1 (a correction of No. 7). For these keys address the author, Mr. Edo Claassen, 18 Fernwood avenue, East Cleveland, Ohio.

It is only just to Miss Haynes, however, to state that her list was not intended to be exhaustive, only giving as she states books and pamphlets she has most frequently used. Any other titles that correspondents have found useful will be gladly added if sent to the Editor.

NOTES ON JUBULA PENNSYLVANICA.

ANNIE LORENZ.

In *Rhodora*, Vol. 7, March, 1905, Dr. Evans describes our eastern American form of *Jubula* as a separate species, namely, *J. Pennsylvanica* (St.) Evans.

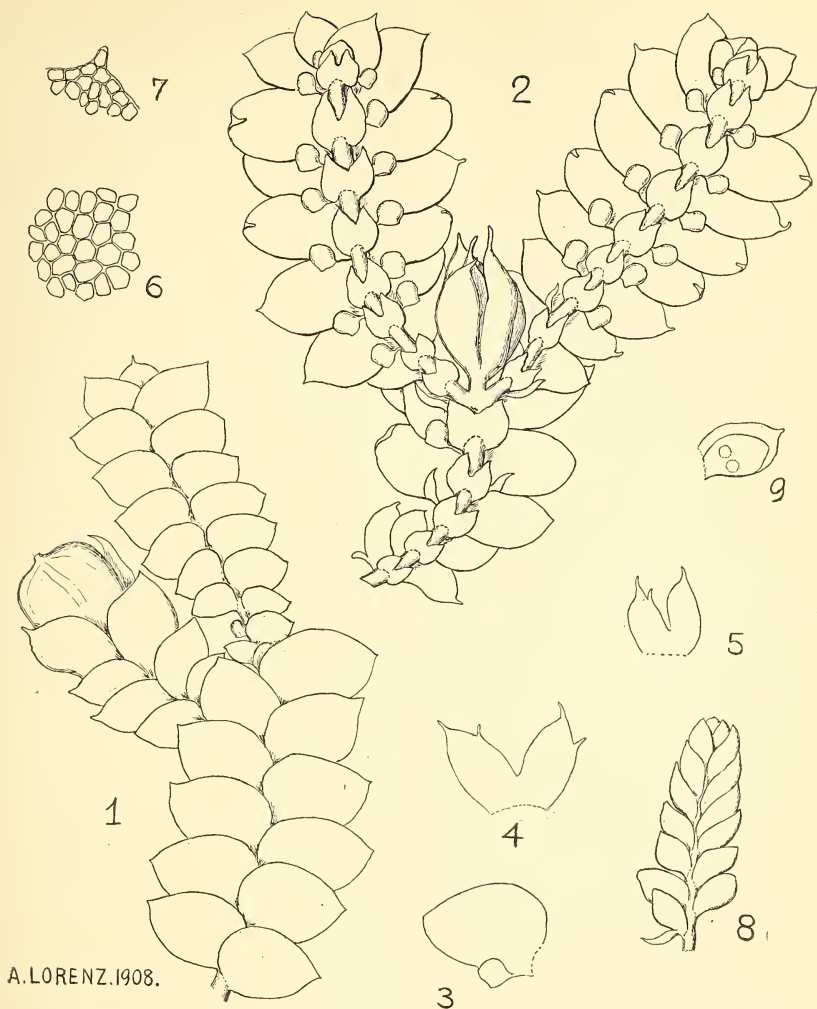
Underwood, in Manual 6, ed. 1890, p. 706, describes this form as *var. Sullivantii* Spruce, but the figure given is typical European *J. Hutchinsiae*.

As there is no plate of *J. Pennsylvanica* as yet, one is presented herewith.

The bracts of *J. Pennsylvanica* are described as acuminate and entire, but some of the more robust bracts and bracteoles show a tooth on one side of each lobe. The antheridial spikes resemble those of *Frullania Eboracensis*, but larger. Bracts complicate-bilobed, the lobes unequal, ovate, more or less acute, and enclosing two antheridia each.

This species is reported from most of the New England states; evincing a preference for those rocks containing potassic compounds.

Hartford, Conn.



A. LORENZ. 1908.

EXPLANATION OF PLATE V. *Jubula Pennsylvanica*.

- Fig. 1. Plant with perianth, antical view, X 80.
- Fig. 2. Branch, postical view, X 80.
- Fig. 3. Leaf, postical view, X 80.
- Fig. 4. Bract, X 80.
- Fig. 5. Bracteole, X 80.
- Fig. 6. Leaf-cells, middle of leaf, X 480.
- Fig. 7. Tip of leaf, X 480.
- Fig. 8. Antheridial spike, X 80.
- Fig. 9. Antheridial bract, X 80.

These figures were all drawn from specimens collected by the writer; Nos. 1-7, from Salisbury, Conn., 8-9 from Rainbow, Conn. All reduced one-half.

LICHEN NOTES No. 5.*

REMARKS ON NOMENCLATURE AND THREE NEW NAMES.

G. K. MERRILL.

The very full explication given to the genus *Ramalina* in Nylander's *Recognitio Monographica Ramalinarum*, provided for lichenists a treatise whose value is scarcely impaired by the lapse of years. Naturally the names of some of the species have met with revision, investigation has resulted in some elisions, and a few of the forms remain unrecognized except by the great lichenist himself; but the comprehensiveness of the work is conceded, it is exceedingly usable, and its disposition of species has in the main been followed by later writers. The late Prof. E. Tuckerman is a notable exception however, giving us in his *Synopsis* Pt. I, 1882, an entirely different view of the genus with respect to some of the specific affinities and names. Differing from Nylander in that author's disposition of the *Ramalina calicaris*, *Ramalina rigida* and *Ramalina pusilla* groups, in *R. calicaris* he follows the thought of the elder Fries. *R. rigida* is made to stand for several of Nylander's names, and in *R. pusilla* he totally differs from the accomplished monographist. It is not easy to determine why Tuckerman adopted the view of Fries with respect to the *R. calicaris* group, for its forms are so protean that it is only by attentively studying the minuter differences that a clear understanding is arrived at. Nor is it comprehensible that clarity is aided by the reduction of the many and strikingly dissimilar forms allied to *R. rigida* to one species. There can be no question but what the labor of determining species is minimized by conservatism of Tuckerman's sort, but who is satisfied with a moderate understanding of a subject under investigation, if a broader or more detailed comprehension is obtainable. Nylander has been accused of triviality of diagnosis in his separation of *Ramalina* forms, and it is to be conceded that he made use of every last character that analysis could seize upon. But if trivial facts of diagnosis are found to be typical and constant, no better confirmation of opinion is needed, and no reason exists for disavowing a thing merely because it is trivial.

The names made use of in the following notes to designate species and varieties are either such as have escaped revision since the publication of Nylander's *Monograph*, or the product of historical recasting. American students will have no difficulty in properly referring their *R. calicaris* forms now identified in Tuckerman's sense, if it be remembered that *R. fastigiata* and *R. fraxinea* must have curved spores, and *R. calicaris*, with its varieties and *R. farinacea* straight spores.

*Lichen Notes No. I, BRYOLOGIST, 8: Nov. 1905, No. II, BRY. 9: Jan. 1906, No. III, BRY. 9: July, 1906, "Chemical Tests," No. IV, BRY. 9: Sept. 1906.

RAMALINA CALICARIS (L.) Nyl. Mon. Ram. p. 33.

Lichen calicaris L. Sp. Plant, (1753) p. 1146.

Compare Dill. Hist. Musc. pl. 23. f. 62, cited by Linnaeus.

No reaction noted with KHO

This is *R. calicaris* Fr. var. *canaliculata* Fr. of Tuckerman's Synópsis. Distinguishable by its channelled laciniae, these being sometimes simple, narrow, and linear with few lateral branches, or flexuous and di-trichotomously much branched. The apothecia are marginal or terminal, in the latter case usually spurred. Spores straight, oblong-ellipsoid, $11-14 \times 4-7\mu$. This plant is often mistakenly referred to *R. rigida*.

RAMALINA CALICARIS var. SUBAMPLIATA Nyl. Mon. Ram. p. 34.

Laciniae from narrow to sometimes broad (1 cm.), irregularly divided, and often lacerate, the surface rugose, darker in color than the type. Apothecia marginal, terminal or superficial. Spores straight, $10-17 \times 4-7\mu$. Commonly identified in this country as *R. calicaris fraxinea* Fr. D. N. A. Lich. No. 222 is so referred, likewise Macoun's Canadian Lichens No. 12. The late Prof. E. E. Bogue distributed the plant as var. *fraxinea*. Examined from Noroton, Ct., Mrs. Lowe; Milwaukee, Wis., Dr. Sherman; Cameron, La., Mr. Cocks; and vicinity of Baltimore, Md., Mr. Plitt, Nos. 3, 53, and 53a.

RAMALINA CALICARIS var. SUBFASTIGIATA Nyl. Mon. Ram. p. 34.

Resembling both the type and *R. fastigiata*. The apothecia terminal and often without the spur. Spores straight (in *R. fastigiata* curved) $12-17 \times 4-6\mu$. No. 5 L. B. A, belongs here and the plant is found in Knox Co., Maine. I have as yet seen no *R. fastigiata* (sensu Nyl.) from American sources.

RAMALINA FARINACEA (L.) Ach. L. U. p. 606.

Lichen farinaceus L. Fl. Suec. 2nd ed. p. 1089.

This is *R. calicaris* v. *farinacea* Schaer. of Tuckerman's Synopsis. Only once seen with apothecia in a specimen collected in Knox Co., Maine, by the writer. It is a plant of common occurrence in temperate regions with several distinct aspects or modes of growth. Only one will be particularized here and that:

RAMALINA FARINACEA forma **latus** Merrill in litt.

Collected on San Juan Island, Wash., by Mr. S. A. Foster, No. 559. The form is characterized by extremely broad laciniae (9 mm.), with the soredia marginal and terminal. In the specimens examined the laciniae attain a length of 4 cm. only, and the peculiar condition is probably due to its growth in an excessively moist situation.

RAMALINA FRAXINEA (L.) Ach. L. U. p. 602.

Lichen fraxineus L. Fl. Suec. 2nd ed. p. 1091.

Only one American specimen of this species has been examined, collected by Prof. B. Fink on trees at Red Lake; Minn. The specimens are leaf-like and referable to the form *monophylla* Crombie. Grevillea VII (1879) p. 141. Spores curved, $15 \times 6.5\mu$.

RAMALINA COMPLANATA (Sw.) Ach. L. U. p. 559.

Lichen complanatus Sowerby Fl. Ind. occid. III, p. 1911, me. KHO—

Examined in a specimen from Snake Key, Fla., collected by Mr. Baker and communicated by Mr. S. Rapp. Spores variously ellipsoid, straight, $11-18 \times 3-5\mu$. The laciniae papillate.

RAMALINA DENTICULATA (Eschw. Brazil, p. 221, sub Parmelia) me. KHO+yellow, at length red.

Very similar to *R. complanata* but distinguished by its behavior with KHO, and curved spores $10-13 \times 4.5-5\mu$ in dimensions. Plant small, but the apothecia sometimes a centimeter in diameter. Collected in Jamaica by the late Miss Clara E. Cummings.

RAMALINA LINEARIS (Sw.) Nyl. Mon. Ram. p. 31.

Lichen linearis L. fil. et Sowerby Meth. Musc. illustr. p. 36.

Forma **spinulosa** Merrill, me. KHO—

Thallus attaining to 13 cm. in length, compressed, narrowed, canaliculate, linear and acuminate, pale straw-colored, the secondary branches patent, as likewise the short filiform branchlets, with the major divisions present and clothed. Apothecia small, lateral, pedicellate, at length rather convex. Spores ellipsoid, straight $13-17 \times 7\mu$. Collected in Jamaica by the late Miss Clara E. Cummings. *R. canaliculata* Tayl. is with difficulty separable from this species.

RAMALINA ALLUDENS Nyl. Mon. Ram. p. 32.

Distinguished from *R. linearis* of which Tuckerman in Syn. makes it a variety, by the distinctly narrow, slightly curved, fusiform spores $27-34 \times 3-4\mu$, No. 193 Pringle's Mexican Lichens belongs here.

RAMALINA USNEOIDES (Ach.) Fr. L. E. p. 468.

Parmelia usneoides Ach. Meth. p. 270.

Spores straight, fusiform, $23 \times 3.5\mu$, No. 206 Pringle's Mexican Lichens. Seems to be common in Mexico, and is a very handsome plant.

RAMALINA ANCEPS Nyl. Syn. I, p. 290, me. KHO+yellow, at length red.

Laciniae elongated, pendulous, slender, compressed, ancipital, sub-linear, smooth and somewhat shining, dichotomously divided throughout. The terminal branchlets attenuate and flexuous. Apothecia pallid, geniculate affixed. Spores ellipsoid or oblong-ellipsoid, straight, $12-18 \times 5-8\mu$. Collected in Jamaica by the late Miss Clara E. Cummings. This species should be looked for in the southern States.

RAMALINA YEMENSIS (Ach.) Nyl. Mon. Ram. p. 46.

Ramalina fraxinea var. *Yemensis* Ach. L. U. p. 602, me. KHO—

This is *R. laevigata* Fr. of Tuckerman's Syn. Spores straight, $10-14 \times 4.5-5\mu$, No. 81 D. N. A. Lich. from Austin, Texas, and No. 13 Pringle's Mexican Lichens from Monterey, Mexico, typical; No. 458 Plants of Mexico, collected by Dr. Palmer at Alvarez, State of San Luis Potosi, is in part forma *sublinearis* Nyl. l.c. p. 46, and appears to be an alpine state; No. 244 Pringle's Mexican Lichens is forma *laticor* Nyl. Mon. Ram. p. 46, and has larger spores than the type.

RAMALINA POLLINARIA Ach. L. U. p. 608.

Lichen pollinarius Ach. in V. ac. H. (Act. Holm.) 1797; p. 263, Pl. XI. f. 2, me. KHO—

A plant received from Mr. A. S. Foster, collected at San Juan Island, Wash., in 1907, seems to be the var. *humilis*. No other American material thus far seen seems referable to this species, although several specimens examined, all provided with mealy soredia, have been so marked by our collectors. Just what form Tuckerman refers to in Syn. p. 27, as occurring on trees and rocks, it is difficult to say, unless it be a plant generally diffused throughout the northern U. S. commonly found on rocks, which while resembling minor states of *R. farinacea* has the laciniae of *R. dilacerata* f. *pollinariella*. Invariably occurring without apothecia, the status of the form is doubtful. It is altogether different from the San Juan plant cited, which while provided with apothecia, affords no spores.

RAMALINA POLYMORPHA (Ach.) L. U. p. 600.

Lichen polymorphus Ach in V. ac. H. 1797, p. 270, Pl. XI. f. 3, me. KHO—

Tuckerman cites a plant collected by Wright at Bering Strait as referable here, but states that it differs from the European forms of the species. Assuming that Wright's plant may be identical with one collected at a later date by J. M. Macoun on St. Paul's Island and issued as Nos. 6 and 8 of Macoun's Canadian Lichens, this difference is to be clearly perceived. Both of the Macoun specimens are granulose-sorediate rather than farinose, but in all other particulars, even to the extent of being more or less foraminous, agreeing with *R. dilacerata pollinariella* Arn. The plant is better referable to that species, for published examples (Zahlbruckner's Kryp. exsic. No. 464 and L. B. A. No. 179) show distinctly granulate condition of the soredia. Miss C. E. Cummings in Lichens of Alaska cites *R. polymorpha emplecta* Ach. from St. Paul's Island, collected by Dr. Bean. But the ultimate branchlets of Macoun's examples from the same locality are not acuminate, nor the major segments strongly longitudinally costate-rugose as in that variety. Nylander in Freti Behringii cites *R. pollinariella*, equivalent with *R. dilacerata pollinariella* as herein understood, from this region, and *R. pusilla geniculata* Tuckerm. under which name Tuckerman recognizes the same thing is reported from various adjacent localities. *R. polymorpha* seems to be non-existent in the United States.

RAMALINA CUSPIDATA (Ach.) Nyl. Mon. Ram. p. 60.

R. scopulorum var. *cuspidata* Ach. L. U. p. 605.

No. 9. ex. herb. Geological Survey of Canada, so marked, is fistulous, and foraminous, hence belongs with the *R. pusilla* section of Nyl Mon. Ram. p. 63. It seems best comparable with *R. javanica* Nyl. l.c. p. 69, me. KHO—

RAMALINA DILACERATA (Hoffm.) Wainio in Medd. Soc. pro. faun. et flor. fennic. XIV (1888) p. 14 and 21.

Lobaria dilacerata Hoffm. Deutsch. Fl. (1796) p. 140. me. KHO—

This is *R. minuscula* Nyl. Mon. Ram. p. 66, and *R. pusilla geniculata* Tuck. Syn. p. 26, is made a synonym by that writer. Tuckerman's disposi-

tion of American representatives of the fistulous Ramalinas is unsatisfactory and incomprehensible. No. 3 Macoun's Canadian Lichens of published American exsiccati seems to represent the species best, although No. 207 D. N. A. Lich. is scarcely inferior. It is probable that Tuckerman would have referred both to his *R. pusilla*, and it is equally certain that both are *R. minuscula* in Nylander's sense. The cortex is filamentous rather than amorphous, that character being assigned to *R. pusilla*. The species is usually esorediate and to a considerable degree resembles *R. fastigiata* in miniature.

RAMALINA DILACERATA F. POLLINARIELLA Arn. in Verh. Zool. Bot. Ges. Wien.

XLVII (1897) p. 354.

This is the multifid lacinate form that by most American students is referred to var. *geniculata* Tuckerm. of *R. pusilla*. Commonly infertile, the specimens vary considerably in size, being small on a saxicoline substrata, and larger with more numerous branches on a corticoline. The smaller states, were it not for their being more or less fistulous, might be as readily identified as *R. farinacea*. No. 179 L. B. A. represents the saxicoline form. Both the species and variety are northern in range, the species having been examined from Nipigon Lake, Cape Breton, Hastings, B. C., Victoria, V. I., and Quebec, collected by Prof. J. Macoun; Newfoundland, Waghorne; while the variety comes to notice from Sable Island, Murray River, Que., Cape Breton, the Gaspé Country, Anticosta, J. Macoun; and St. Paul's Island, Bering Sea and Unalaska, J. M. Macoun; Maine and New Hampshire, Merrill.

RAMALINA INFLATA Hook. fil. et Tayl. Antarct. I, p. 194.

Var. **soredians** Merrill var. nov. me. KHO—

Agreeing with the species except that the laciniae laterally and sometimes apically show a tendency to fissure, when the perforation becomes more or less circular, the inner wall of the podetia-like branch becomes visible through the perforation and all the exposed surface takes on a farinose aspect. Collected in Jamaica by the late Miss C. E. Cummings.

RAMALINA RIGIDA (Pers.) Nyl. Mon. Ram. p. 14.

Lichen rigidus Pers. in litt.

Physcia attenuata Pers. in Act. Societ. Wetterau. II. Pl. 10, s. 7, me.

KHO+

Pearson's illustration of *Physcia attenuata* is sufficiently like *R. gracilentia* (Ach.) Nyl. but Nylander considers that it represents *R. rigida*, or at least his conception of it. Nylander distinguishes those closely allied forms of the *R. rigida* group in this manner. *R. rigida* is at once separated by the reaction with hydrate of potash me. KHO+yellow, at length red. The plant grows in a fruticulose manner, and the laciniae are terete or teretecompressed, the cortex smooth. Spores 10–15 × 7–8μ, straight, ellipsoid or oblong-ellipsoid. *R. gracilis* is characterized by longitudinally striate, sub-costate, angulose laciniae, caespitose habit, and larger spores, these being 11–21 × 7–9μ, straight, ellipsoid, or oblong or fusiform-ellipsoid, and lack of reaction with hydrate of potash. *R. gracilentia* differs from *R. gracilis* to which it is very closely allied in having slightly shorter and nar-

rower spores ($11-18 \times 4-5\mu$) these commonly *distinctly fusiform*, and by the tendency of the laciniae to become *torulose*. As in *R. gracilis* there is no reaction with potash. No American specimens of the *R. rigida* stock have yet been examined showing a medullary coloration on application of KHO, and it is certain that in Nylander's sense our southern examples must be referred to either *R. gracilenta* (Ach.) Nyl. Mon. Ram. p. 19, or *R. gracilis* (Pers.) Nyl. l. c. p. 17.

The so-called northern form of *R. rigida* that Willey in New Bedford Lichens thinks in its larger states may be referable to *R. gracilenta* has distinctly straight, ovoid or oblong-ellipsoid spores $8-15 \times 4-6\mu$ with the apothecia rather terminal than otherwise (in *R. rigida* and its allies commonly lateral). The form in no way resembles *R. gracilenta* and it is thought best to revive Tuckerman's name of *R. tenuis* for its designation. Very similar forms are collected in Florida, showing that it is not exclusively northern, and the character cited by Tuckerman for his *R. rigida*, of "besprinkled often with white warts," may only be applied to states of this species.

Rockland, Maine.

NOTES ON THE FRUITING SEASON OF SOME OF THE MOSSES.

PHEBE M. TOWLE.

Altho Dr. H. W. Arnell, of Upsala, Sweden, published, in 1875, a long list of the mosses of his country, giving their blooming and fruiting season and the time required for the development of their sporophytes, and Dr. A. Grimme brought out, in "Hedwigia," 1903, a similar list for Germany, yet, so far as the writer is aware, no extended list of this nature has been made for any part of America.

Not only do the months for the blooming and the fruiting vary with the latitude and the climate, but the length of time required for the development also varies under differing conditions. So if a list should in time be made for Burlington, Vt., for instance, it would not wholly agree with a list made for a locality further south. In fact, in an instance to be mentioned later, the dates for northern Vermont do not agree with those for the region of New York City.

Dr. Arnell, in THE BRYOLOGIST for May, 1905, mentions the value of observations repeated for several years for the sake of medium dates. The necessity for securing average dates has been emphasized by the late springs of 1906 and 1907, as compared with the early spring of 1905. In the latter year we had a warm April. But in 1906 on my first trip afield in the middle of April I found ice under the leaves on the slopes, and the flat was a sheet of ice. The first warm days began May 14th.

In 1905 *Mnium sylvaticum* is recorded as shedding spores the latter half of April, while in 1906 the same species, in shady places in town, did not open their lids until May 16th, the third warm day, while *Mnium affine ciliare* was several days later. Altho the development of these mosses was delayed by the cold spring their blooming time was apparently not affected; for the blooming time of both years was the same month—June, the 15th of the

month being about the middle of the blooming time. Taking the average of the three years, *Mnium sylvaticum* shows the blooming time to be June and the fruiting time the latter half of April and May, time ten or eleven months. For *Mnium affine ciliare*, blooming in June, the fruiting time is the following May, time eleven months.

Mnium Drummondii, of which I felt uncertain, (See THE BRYOLOGIST IX. 3, 55) has been verified by Dr. Grout. It occurs near *Mnium affine*, which is abundant while *Mnium Drummondii* is rare. They correspond in dates.

I first noticed the Giant Bryum [or *Rhodobryum roseum* in fruit in the early spring several years ago, a little clump of it near the drive in Fair Holt. The notes, however, have been made from material in Ethan Allen Park. It is a large, rather handsome moss with the leaves somewhat crowded into a large rosette at the top. The sporophytes are usually clustered. The female plants are abundant, the male rare. On Sept. 20, 1906, I found both kinds of rosettes with their antheridia and archegonia beginning to open. By Oct. 1st their blooming time seemed to be over; the antheridia had discharged their antherozoids and the archegonia which had not been fertilized were turning brown.

The following spring, April 24th, the rosettes showed the sporophytes developing. They could be distinguished with the naked eye and well seen with the hand lens. In September this moss had sporophytes, from two to four in a cluster, which were tall and green with a suggestion of brown. They were pretty closely watched until Nov. 27th when they were reddish-brown but their lids were on tight. On April 24, 1907, I found these sporophyte capsules with their lids mostly off, altho a few were on, and the spores shedding freely.

According to these observations for Burlington, Vermont, the blooming time of *Rhodobryum roseum* is the latter half of September and the fruiting season the latter half of April, time one year and seven months. But Dr. Grout gives the blooming time in the vicinity of New York City as August and early September, and the fruiting time as autumn.

Another beautiful little moss is *Bartramia pomiformis*. It forms a mat of bright green, fruits freely, and the capsules, as the name indicates, are somewhat spherical or apple shaped. It is monoicous, and is quite abundant at Fair Holt.

On June 14, 1906, the rosettes of this moss showed antheridia and archegonia that were old and brown, also those that were fresh, open, and active, and still others that were not full grown. In October, the new sporophytes were seen with the aid of a hand lens. Following on till the next spring they were mature and shedding spores by the middle of May; time, eleven months.

On May 16th, in the *Bartramia pomiformis* from Fair Holt, the sporophytes were shedding spores, but in the material from near Colchester Point, some of the capsules had their lids on as late as May 26th.

Prof. Jones tells me that there is about the same difference, ten days, in the blossoming of the willows on the hill and the lake shore. Those near the cold water of the lake are about ten days later.

This illustrates in a small way the variations due to different climatic conditions in the same latitude and in near by places.

Jan. 17, 1908.

Burlington, Vermont.

lichens collected in the Tehachei Mountains,
California, June, 1907,

By Dr. H. E. Hasse.

The district explored embraces only a small portion of the Tehachei Range and extends westerly and southerly from the station of Tehachei about fifteen miles, the elevation covered varying from 1,500 to 2,500 meters, the highest being locally known as Mt. Cummings.

DERMATOCARPUM MINIATUM (L.) Mann. Spores oblong-ellipsoid, 20μ long, 9μ thick. On shaded rocks.

DERMATOCARPUM RUFESCENS Ach. On earth among rocks.

CALICIUM PUSILLUM Flk. Thallus white subleperous; apothecia lenticular, entirely black, on short stipes; spores narrowly ellipsoid, bilocular, $9-12\mu$ long, $3-4\mu$ thick, dark gray, very slightly constricted at the middle. On decorticated dead oak wood.

CYPHELIUM TIGILLARE (Pers.) Th. Fr. On decorticated dead pine wood.

Cyphelium Carolinianum (Tuck.) Hasse n. comb. Thallus verruculose, ash or dirty yellowish colored; apothecia innate, black, papillate. Spores bilocular, $16-20\mu$ long, $8-12\mu$ thick, constricted at the middle. On bark of conifers.

LECIDEA ATROBRUNNEA (Ram.) Schaer. On granite.

LECIDEA POLYCARPA Fr. See Tuck. Syn. N. A. Lich. part 2, p. 69. On granite.

LECIDEA ENTEROLEUCA Fr. On granite.

LECIDEA ENTEROLEUCA Fr. var. ACHRISTA Sommerf. On bark of conifers.

LECIDEA AURICULATA Th. Fr. f. DIDUCENS (Nyl.) Th. Fr. (*L. auriculata paupera* Stig.).

LECIDEA FUSCO-ATRA (L.) Th. Fr. This and the preceding species on rocks.

LECIDEA FLEXUOSA Fr. On dead wood.

LECIDEA RUBIFORMIS Wnbg. Thallus of large squamules, reniform, ascendant, closely imbricated, pale greenish-dun colored above, beneath whitish, margin entire or lobulated, forming small cushions on earth in crevices of rocks, apothecia globular, often becoming conglomerate, immarginate, dark brown, situated at bases of the squamules. Spores ellipsoid, 16μ long, 7μ thick.

LECIDEA GRANULOSA (Ehrh.) Schaer. Thallus whitish gray, reaction with K orange-yellow and with C reddish; apothecia small, 0.25 to 0.5 mm. in diam., rusty-black to black, by crowding becoming irregular in outline and the margin finally disappearing; paraphyses coherent, hypothecium pale, spores narrow ellipsoid with blunt ends, $10-14\mu$ long by $4-5\mu$ thick. On dead pine wood.

BACIDIA MILLIARIA Fr. Thallus white, chinky or areolata, sparse; apothecia sessile, flat, black with a thin permanent margin; spores finger-shaped, at times somewhat curved, indistinctly pluriseptate, $20-32\mu$ long, $4-5\mu$ thick; hypothecium pale. On dead oak wood.

GYROPHORA RUGIFERA (Nyl.) Th. Fr. On rocks at the highest elevation above given. In all specimens seen from Southern California, where it occurs in the highest mountains from 2500 meters upwards, the lower surface of the thallus is without fibrils and somewhat lighter in color than the upper.

Gyrophora phaea (Tuck.) Hasse n. comb. Thallus dark below, granulate; hymenium 100μ high; hypothecium dark brown; paraphyses coherent; thecae broadly clavate, 60μ high, 20μ thick; spores 13-16 μ long, 8-10 μ thick, broadly ellipsoid; hymenial gelatine with I brown, the spores a faint greenish yellow. Frequent on rocks at 1700 meters alt.

GYROPHORA POLYPHYLLA (L.) Koerb. On granite boulders.

GYROPHORA HIRSUTA (Ach.) var. *GRISEA* (Sw.) Th. Fr. With the last on granite boulders.

UMBILICARIA SEMITENSIS Tuck. One-leaved, 3-5 cm. in diam. Above smoky gray, smooth but centrally becoming finely areolated, beneath almost black, coarsely granulated and towards point of insertion rugulose; margin of frond reverted; apothecia crowded toward the circumference of frond, even confluent, black, angular or round, plicate, thecae balloon shaped, 72-112 μ long, 16-20 μ thick, with a thick sack wall; spores uniform, from 24-26 μ long and 16-20 μ thick. This last with the two preceding species thickly cover the north side of large granite boulders crowning a butte several acres in extent, situated within a few minutes northward of Tehachepi station.

BIATORELLA RESINAE Fr. Thallus indistinct or obsolete; apothecia small, sessile, black, brownish when moist, convex, immarginate, crowded; thecae balloon shaped, 40 μ by 28 μ ; spores numerous, globular, about 2-3 μ in diam. Reaction with I blue changing to sordid claret. On bark of conifers.

ACAROSPORA CHLOROPHANA (Walbg.) Mass. On rocks; not frequent.

PERTUSARIA WULFENII DC. On bark at the base of trunks of *Quercus Californica*.

LECANORA SAXICOLA (Poll.) On rocks.

LECANORA SAXICOLA (Poll.) Ach. var. *DIFFRACTA* Fr. On rocks.

LECANORA RUBINA (Vill.) Wainio var. *MELANOPHTHALMA* (DC.) Th. Fr. On rocks.

LECANORASORDIDA (Pers.) Th. Fr. var. *BICINCTA* (Ram.) Th. Fr. The convex densely pruinose disk is circumscribed by a thin black excipulum. Spores 18 μ long, 6 μ thick. On rocks.

LECANORA SUBFUSCA (L.) Ach. On barks and rocks; also its variety *ALLOPHANA* Ach., on dead wood.

LECANORA VARIA Ach. On barks and rocks. Its varieties *symmicta* Ach. and *saepincola* Fr., on dead wood and dead bark.

LECANORA HAGENI Ach. On bark.

LECANORA GIBBOSA (Ach.) Nyl. On rocks. A similar lichen on bark of pine with ovate spores 20-30 μ long, 14-20 μ thick, granular, mononucleolate; hymenium 225 μ high; paraphyses coherent; thecae 175 μ long, 28 μ thick, sack shaped.

- LECANORA CALCAREA (L.) Sommerf. On rocks.
CANDELARIA VITELLINA (Ehrh.) Mull. Arg. On barks and rocks.
PARMELIA OLIVACEA (L.) Ach. Frequent on barks and rocks.
PARMELIA EXASPERATA (Ach. Nyl. Likewise common on barks and rocks.
PARMELIA PHYSODES (L.) Ach. var. ANTEROMORPHA Tuck. On various barks.
CETRARIA CALIFORNICA Tuck. On barks of conifers.
ALECTORIA OREGANA Nyl. Frequent on limbs of conifers.
LETHARIA VULPINA (L.) Wainio. On bark of conifers. The apothecia are frequently luxuriant, attaining at times a breadth of 33 cm. The lichen was also seen on rocks and bark of deciduous trees, but in these cases sterile and poorly developed.
BLASTENIA FERRUGINEA (Huds.) Arn. On bark.
CALOPLACA AURANTIACA (Lightf.) Th. Fr. On bark.
CALOPLACA MURORUM (Hoffm.) Th. Fr. On bark.
XANTHORIA POLYCARPA (Ehrh.) Th. Fr. On various barks.
THELOCHISTES RAMULOSUS Tuck. Same habitat as the last.
BUELLIA PARASEMA (Ach.) Th. Fr. On bark of *Fremontia Californica*.
BUELLIA ALBOATRA (Hoffm.) Tr. Fr. On bark of conifers.
BUELLIA PULCHELLA (Schaer.) Tuck. Spores 18-20 μ long, 9-10 μ thick, hymenium 80 μ high; hypothecium brown; paraphyses coherent; thecae dilated sack shaped, 72 μ long, 18 μ thick. Hymenial gelatine with iodine blue, then sordid yellow.
RINODINA SOPHODES (Ach.) Th. Fr.
RINODINA EXIGUA (Ach.) Th. Fr.
RINODINA CONFRAGOSA (Ach.) Koerb. These last three on various barks.
RINODINA SUCCEDENS Nyl. On bark of *Pseudotsuga macrocarpa*.
PHYSICIA CILIARIS (L.) Mass. Rocks, rarely in fruit.
PHYSICIA PULVERULENTA (Hoffm.) Nyl. f. MUSCIGENA Nyl. On rocks.
PHYSICIA PULVERULENTA (Hoffm.) Nyl. Subsp. PITYREA Nyl. On rocks.
PHYSICIA PULVERULENTA (Hoffm.) Nyl. Subsp. ISIDIIGERA A. Zahlbr. (Herre, Lich. of the Santa Cruz Peninsula, Cal.) Shaded rocks.
PHYSICIA PULVERULENTA (Hoffm.) Nyl. var. SUVENUSTA Nyl. Also the forms DEMINUTA Cromb. and PANNIFORMIS Cromb. (Crombie, Brit. Lich.) On rocks.

In the January BRYOLOGIST, XI. 1908, page 6, at bottom, for *Catocarpon myriocarpum* (Mudd) f. *ecrustacea* (Leight) etc., read *Buellia myriocarpa* (DC.) Mudd f. *ecrustacea* Leighton, and for *Catocarpon myriocarpum* (Mudd) v. *punctiformis* (Mudd) Fr. read *Buellia myriocarpa* (DC.) Mudd v. *punctiformis* (Hoffm.) Mudd.

Sawtelle, California.

RECENT BOTANICAL LITERATURE.

In *Revue Bryologique* Vol. 34, No. 5, 1897, pp. 87-92, Prof. N. C. Kindberg has some more characteristic "New notes on the Northamerican bryology." Dr. Kindberg's work is so well known that comment is unnecessary. We list his new species and varieties withholding descriptions until their synonymy has been ascertained.

PSEUDOLESKEELLA GLABERRIMA Kindb. n. sp. Canada, Sask., Little Manitou Lake, on boulders: J. Macoun.

EURHYNCHIUM GLACIALE (Br. eur.) Kindb. *E. *INFRAALPINUM* Kindb. n. subsp. Canada, Cape Breton, at base of trees: J. Macoun.

EURHYNCHIUM GLACIALE var. *ANGUSTIFOLIUM* Kindb. n. var. Canada, Brit. Col. Laggan, on stones in a brook; J. Macoun.

BRACHYTHECIUM RIVULARE Br. eur. *B. *COLPOPHYILLOIDES* Kindb. n. subsp. Wet logs. Canada, Brit. Col., Joho Valley, Quebec, Chelsea: J. Macoun.

BRACHYTHECIUM VELUTINUM Br. eur. *B. *CURVIRAMEUM* Kindb. n. subsp. Canada, Quebec: J. Macoun.

HYPNUM SUBDENSUM Kindb. n. sp. Missouri, Crève Coeur Lake on earth. N. L. T. Nelson.

HYPNUM (DREPANOCLADUS) JAMESII-MACOUNII Kindb. n. sp. Alaska, St. Paul's Island: J. M. Macoun.

TETRAPLODON URCEOLATUS (Brid.) Br. et. Sch. *T. *SUBMNIOIDES* Kindb. n. subsp. Canada, Labrador: Rev. A. C. Waghorne, com. Macoun.

DICHODONTIUM NELSONII Kindb. n. sp. Missouri, Cliff Cave: Kellogg, com. N. L. T. Nelson.

GRIMMIA PAPILLINERVIS Kindb. n. sp. Canada, Brit. Col. Skagit summit: J. M. Macoun.

GRIMMIA ELATIOR Bruch. *G. *RUFESGENS* Kindb. n. subsp. Canada, Hudson Bay, Baffin Land, on earth: A. P. Low, com. J. Macoun.

GRIMMIA SERRATA Kindb. n. sp. Canada, Brit. Col., Rossland: J. M. Macoun.

ORTHOTRICHUM AFFINE Schrad. *C. *SUBRIVALE* Kindb. n. subsp. Canada, Quebec: J. Macoun.

BRYUM LOWII Kindb. n. sp. Canada, Hudson Bay, Southampton Island: A. P. Low (Director of the Geological Survey of Canada) com. J. Macoun.

BRYUM JULACEUM Kindb. n. sp. Canada, Brit. Col., Pipestone Pass: J. Macoun.

BRYUM (CÆSPITIBRYUM) GLACIALE Kindb. n. sp. Canada, Brit. Col., Skagit summit: J. M. Macoun.

BRYUM INTERMEDIUM (Ludw.) Brid. *B. *OVATIFOLIUM* Kindb. n. subsp. Canada, Brit. Col., Pipestone Creek: J. Macoun.

BRYUM NANO-CÆSPITICIUM Kindb. n. sp. Canada, Yukon District, Hunter Creek: J. Macoun.

BRYUM PENDULUM (Hornsch.) Schimp. *B. *LONGIPES* Kindb. n. sp. Canada, Brit. Col., Laggan: J. Macoun.

BRYUM PENDULUM, *B. *PARVULUM* Kindb. n. subsp. Canada, James Bay W. Spreadborough, com. J. Macoun.

POHLIA POLYGAMA Kindb. n. sp. Canada, Brit. Col., Rossland; J. M. Macoun.

AMBLYSTEGIUM ADNATUM (Hedw.) *A. NELSONII Kindb. n. subsp. Missouri and Minnesota: N. L. T. Nelson.

Obituary.—The death of Professor William A. Kellerman, head of the department of botany of the Ohio State University, on March 8, 1908, will be a shock to many of our readers. He was with several student assistants on his fourth winter expedition to Guatemala, in the interests of fungi collection. He was born in Ashville, Ohio, May 1, 1850, was graduated from Cornell University in 1874, received the degree of Ph.D. from the University of Zürich in 1881, was professor of botany in the Kansas State Agricultural College from 1883 to 1891, since then has been professor of botany in the Ohio State University. He established in 1885, in association with J. B. Ellis and B. M. Everhart, "The Journal of Mycology." He was also the author of a textbook under the title of "Elements of Botany;" an "Analytical Flora of Kansas" (with Mrs. Kellerman); a "Catalogue of Ohio Plants" (with W. C. Werner), and a large number of short articles involving a wide range of botanical activity. Professor Kellerman was a member of the Torrey Botanical Club, and known to many of the Chapter members and subscribers of THE BRYOLOGIST by correspondence at least. He was buried in Guatemala.

SULLIVANT MOSS CHAPTER NOTES.

New Members. No. 181. Rev. James Hansen, St. John's University, Collegeville, Minn. No. 182. Dr. Howard J. Banker, DePauw University, Greencastle, Ind. No. 183. Mr. William Gray, Mauriceville, Wairarapa, New Zealand. No. 184. Miss Helen E. Underwood, 5 Benefit Terrace, Worcester, Mass.

It is reported that by the first of April, 1909, at the very latest, the large Sphagnum collection of Carl Warnstorf will be placed on sale. This collection, which contains at a conservative estimate about 30,000 specimens from all over the world, with unusually copious notes and annotations, is without doubt the most extensive and valuable peat moss herbarium in the world. Intending purchasers should place themselves in communication before the first of October, 1908, with Carl Warnstorf, Ringstrasse 55, Friedenau, Berlin, Germany.

OFFERINGS.

(To Chapter Members only. For postage).

- Mr. E. J. Winslow, 523½ West Fourth street, Elmira, New York. *Buxbaumia aphylla* L. Collected in New York. *Bartramia Oederi* Swartz. Collected in Vermont.
- Dr. J. F. Brenckle, Kulm, North Dakota (4 cents postage). *Cladonia cristatella* Tuckerm.; *Cladonia mitrula* Tuckerm.; *Rinodina oreina* (Ach.) Mass. All collected near Kulm, N. D.
- Prof. Thomas A. Bonser, Spokane College, Spokane, Wash. *Sticta antraspis* Ach. Collected in Wash.
- Mr. J. W. Huntington, Amesbury, Mass. *Barbula caespitosa* Schwaegr.; *Fontinalis Novae-Angliae* Sulliv. Both sterile, and collected in Amesbury, Mass.
- Mr. A. S. Foster, Westport, Wash. *Grimmia torquata* Grev. st.; *Hypnum giganteum* Schimp. st. Both from western Washington.
- Mr. C. C. Plitt, 1706 Hanover street, Baltimore, Md. *Thelia asprella* Sulliv. Collected in Maryland.
- Mr. Severin Rapp, Sanford, Florida. *Archidium Ravenellii* Sulliv.; *Fissidens Ravenellii* Sulliv. Collected in Florida.
- Miss Caroline C. Haynes, Highlands, New Jersey. *Frullania Eboracensis* Gottsche. Collected by Prof. H. Dupret, in Canada; *Euosmolejeunea duriuscula* (Nees) Evans. Collected by Mr. Severin Rapp, in Florida.

TO THE MEMBERS OF THE SULLIVANT MOSS CHAPTER :

In view of the letter recently sent by Mr. Bigelow to members of the S. M. C. on behalf of the Agassiz Association a few words of explanation are in order. The idea of a society for the study of mosses originated with Mrs. Britton and Dr. Grout. As the Fern Chapter had recently been started it was at the suggestion, I believe, of Mr. W. N. Clute that the moss society also be made a Chapter of the A. A. then in active work. This stage was soon over, and we found we were connected with nothing vital. Our name should have been changed at the time of withdrawal, but this seemed of little importance as we had become used to "S. M. C." In the light of a revival of interest in the A. A. It gives a chance for misinterpretation, and our logical name should be "The Sullivant Moss Society."

Two points became clear at the start, one was that a publication devoted entirely to the bryophytes was necessary, and I was asked to develop such a journal hence *The Bryologist*. The second fact was that our work could never be along popular lines as the term is usually understood. The A. A. aimed to popularize science, but in the nature of our subject we were more strictly technical. This made the board of advisers determine upon withdrawal, which was formally made by me under their direction and not personally.

This is written as proofs are passing through the press and as space is limited must suffice for the time.

April 17, 1908.

ANNIE MORRILL SMITH.



JULY 1908



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICS AND LICHENS

EDITOR
ANNIE MORRILL SMITH
ASSOCIATE
ABEL JOEL GROUT, Ph.D.

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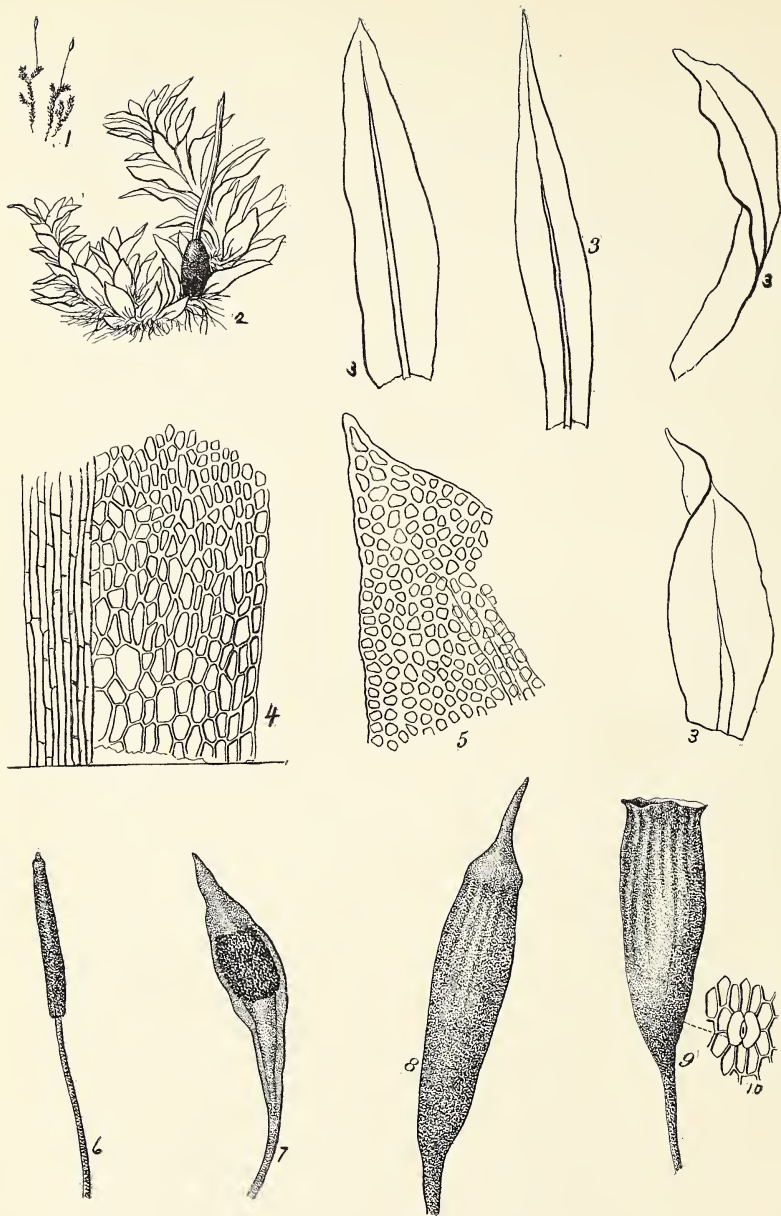


PLATE VI. *Zygodon viridissimus* (Dicks.) R. Br.
Rearranged from Pl. 80 Mem. Torrey Bot. Club, 4: 180, 1893.

THE GENUS ZYGODON IN NORTH AMERICA.

ELIZABETH G. BRITTON.

Three species of *Zygodon* have been listed for the United States and Canada but the genus is omitted from Lesquereux and James' Manual, only *Z. Sullivantii* C. M. being included under *Amphoridium*. Macoun's Catalogue (1892) listed *Z. viridissimus* from sterile specimens collected by Drummond at Hudson's Bay. The same year (1892) Dr. Small and I discovered fruiting specimens of a species of *Zygodon* on the summit of White Top, Virginia, which were also published as *Z. viridissimus*¹, but on comparison with Drummond's these specimens proved to be so different that I concluded they must be a different species and sent them to M. Cardot as *Z. conoideus* by which name they are listed² from Virginia. I also sent them to Dr. Braithwaite as *Z. conoideus* and he generously supplied me with fine fruiting specimens of this species from Mucross, Killarney. These were compared with ours from Virginia and found to be quite distinct having a well-developed peristome. Unfortunately our specimens had capsules that were either too old or still immature, and it was not till a subsequent visit to White Top that Dr. Small collected abundant material in good condition. This proved that our species had no peristome so I concluded it was a new species and sent it to M. Genl. de Paris as *Z. rufo-tomentosus* ined. and it is so listed in his index in both editions. Nothing further has been published until recently in THE BRYOLOGIST for March (1908) Dr. Grout has listed *Z. conoideus*, *Z. excelsus* and *Z. gracilis*, from the mountains of North Carolina with "determinations doubtful."

We are in much better condition to study our North American species now, since Limpricht's masterly descriptions³ and Correns'⁴ studies on reproduction of sterile mosses by brood-bodies as well as Brotherus'⁵ synopsis have appeared. Dixon's⁶ remarks will also be found helpful. According to Brotherus, America is the richest in the number of species, leading with 57 of which 53 are endemic. He recognizes *Z. viridissimus*, *Z. Sullivantii* and *Z. conoideus* for the United States and maintains *Z. rupestris* Lindb. as a distinct species, but does not credit it to North America. It is clear to me from recent studies that two of our North American species belong in the first section with those having no peristome and that Drummond's speci-

1 Mem. Torrey Club 4: 180. Pl. 80. 1893.

2 Musci Am. Sept. 26: 1893.

3 Die Laubmoose 2: 10. 1895.

4 Unt. Vermerh. der Laubm. 114. 1899.

5 Nat. Pflanzenfam. fasc. 215. 460. 1902.

6 Handbook 236. 1896.

mens from Hudson's Bay are referable to *Z. rupestris*. They were so named by Mitten who had a portion of the type. Our Virginia specimens agree with *Z. viridissimus* in habitat as well as structure. It will be found that European authors do not agree as to the specific rank or generic position of these two species nor as to the presence or absence of propagulae in *Z. conoideus*. Limpricht and Brotherus say they are absent, but Correns figures them for this (Fig. 73) species! Also it will be found that Limpricht, Dixon and Paris Index place *Z. rupestris* as a variety of *Z. viridissimus* whereas Brotherus follows Lindberg and maintains it as a distinct species. We have adopted the latter opinion, not only because our collections are being arranged according to the Engler and Prantl Pflanzenfamilien Synopsis, but also because of the great difference in habitat and range of these two species, as well as other differences in aspect and structure, *Z. rupestris* being a shorter plant, reproducing by numerous propagulae.

Zygodon Sullivantii has never been found in fruit and its family and genus have always been doubtful. Sullivant first described it as *Syrrophodon? excelsus* Müller renamed it as *Zygodon Sullivantii* and the manual has it under *Amphoridium*. Mitten placed it in his herbarium under *Leptodontium* and recent studies have led me to believe that this is its nearest alliance. Its method of propagation by leaves rooting at apex and small deciduous terminal buds and lateral branchlets is well illustrated by Sullivant. It will also be found that Brotherus places *Zygodon Sullivantii* in the group having a double peristome with *Z. gracilis*; its generic position must necessarily remain uncertain until the fruit is found! It will be noted that De Notaris also placed *Zygodon gracilis* in *Leptodontium*. Even the genus *Leptodontium* is variously placed, Mitten including it in the *Dicranaceae* and Brotherus in the *Pottiaceae*!

The following synopsis and descriptions may be of service to those who have not access to the literature cited above:

SYNOPSIS.

Peristome lacking. Tomentum with propagulae.

Leaves lanceolate, apiculate, on trees.

1. *Z. viridissimus*.

Leaves ligulate, lanceolate, on rocks.

2. *Z. rupestris*.

Peristome double. Tomentum without propagulae.

Leaves entire. In loose small tufts on trees. (European—*Z. conoideus*.)

Leaves serrate. On limestone rocks, usually sterile. 3. *Z. gracilis*.

ZYGODON Hook. and Tayl. Musc. Brit. 123. 1818.

Plants pulvinate, light or dark green, on rocks or trees. Stems erect, tomentose with rufous tomentum, branched. Leaves crowded, appressed, second or twisted when dry, spreading or recurved when moist, lanceolate or linear-lanceolate, apiculate or blunt, entire or serrate at apex; costate nearly to apex, rarely excurrent; cells round, incrassate, smooth or papillose, elongated at base. Dioicous or autoicous rarely heteroicous or polyoicous, often sterile and reproducing by septate propagulae. Perichaetial leaves only slightly different. Seta exserted, slender. Capsule erect, pyriform or

cylindric, ribbed, mostly small, exannulate; peristome double, single or absent; lid conic or rostrate; calyptra cucullate, smooth or rarely hairy.

Type species *Z. conoideus*; European.

Eleven North American species are known of which eight are Mexican.

1. *ZYGODON VIRIDISSIMUS* (Dicks.) Brown Trans. Linn. Soc. 12: (1.) 575. 1819.

Bryum viridissimum Dicks. Fasc. Pl. Crypt. 4: 9. Pl. 10. f. 18. 1801.

Plants bright green, 1–2 cm. high. Stems tomentose with papillose radicles often having 4–5-celled propagulae; branches and leaves secund, 1.5–2.5 mm. long, lanceolate, apiculate; vein ending below the apex, papillose above, smooth below; cells papillose on both sides, upper rounded, thick-walled, lower rectangular and smooth. Perichaetial leaves smaller. Dioicous. Seta 3–5 mm. long, terminal becoming lateral; capsule 1.5–2 mm., pyriform-cylindric, ribbed when old, walls with thickened ridges; mouth red, small; annulus none; peristome none; spores rough, .013–.016 mm., maturing in August; capsules persistent.

Type locality: England.

Distribution: On trees throughout North and Central Europe. Rare in North America; in the mountains of Northern New York and Virginia to North Carolina and Georgia.

Illustrations: Dickson l. c. Pl. 10. f. 18. 1801. Eng. Bot. pl. 1583. 1805. Hook & Tayl. Musc. Brit. Pl. 6, 1818. Br. Eu. 3, Pl. 206. 1850. Mem. Torrey Bot. Club pl. 80, 1893.

First collected on White Top, Va., May 29, 1892, by J. K. Small and E. G. Britton, growing on *Picea rubra* with *Dicranum longifolium*, *Herberta adunca*, etc. Later found at base of trees in the Adirondack Mountains, N. Y., near Adirondack Lodge, Sept. 1892, and Adirondack Reserve, Sept. 1898, forming bright green sterile cushions, mixed with various other mosses.

2. *ZYGODON RUPESTRIS* Lindb. Milde Bryol. Siles. 164. 1869.

Zygodon viridissimus var. *rupestris* Hartm. Skand. Fl. 9 ed. 52. 1864.

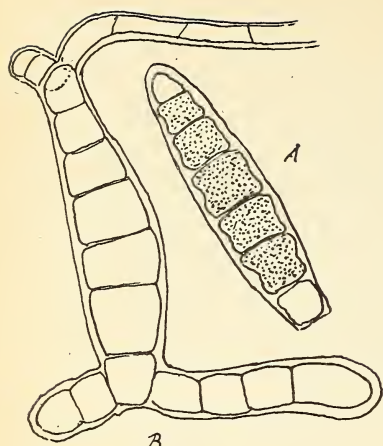
Plants in dense brown cushions matted with radicles at base; stems 1–3 cm. high, bifurcating; branches erect or slightly secund at apex; leaves crowded, slightly circinnate when dry, not recurved but spreading when moist, 1–1.5 mm. long, ligulate-lanceolate acuminate, carinate; costa ending below the sharply subulate apex; margins entire; cells round, thick-walled, minutely papillose, basal cells larger, oblong, clear. Dioicous. Fruit unknown! Reproducing by clusters of 3–5-celled brown *propagulae* borne on radicles in the axils of the leaves.

Type locality: Scandinavia, Lindberg.

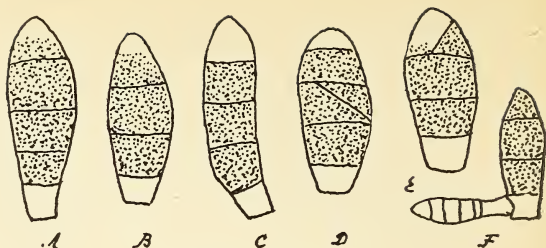
Distribution: On calcareous rocks in mountains of Central and Northern Europe. In America, Hudson's Bay and Vancouver Island. Also on steep cliffs, Cascade Mountains, Washington, J. A. Allen.

Exsiccatae: Drummond, North American Mosses No. 27. 1828. Allen's Mosses of the Cascade Mountains No. 46. 1898.

Illustrations: The gemmae correspond with those figured by Correns Unt. 117. f. 71 for *Z. viridissimus* f. *borealis*!



CORRENS FIG. 73.



CORRENS FIG. 71.

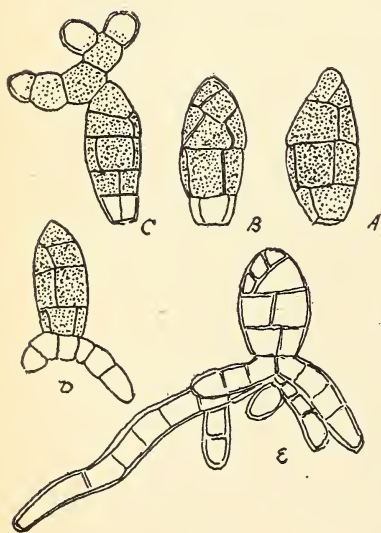
FIG. 69, p. 115, Correns.

Zygodon viridissimus the genuine form from the South and East. A. B. brood-bodies. C. germinating stage from the detritus. D-E. germinating stage from a culture $\times 280$.

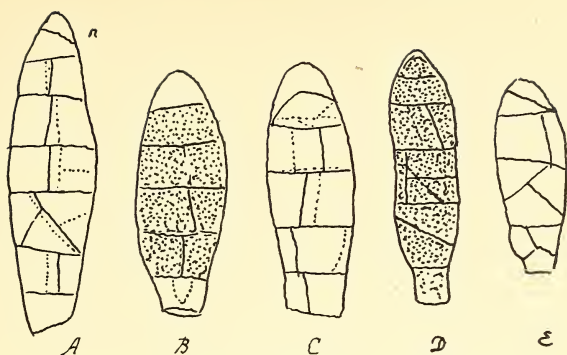
Material from Allgäu, 1895. Dr. Haller.

Zygodon viridissimus forma australis Correns.

In this form the brood-bodies are numerous and almost all sprouted, as in all the species of *Zygodon* which have been investigated, being borne on much branched rhizoids which are clustered in the axils of the leaves. The brood-bodies are shorter and less divided than in figure 70, the form which Correns calls *Zygodon viridissimus f. australis* occid. from the Voges and Departments of Lot and Garonne, France. The Northern form which ours most resemble, Fig. 71, which Correns calls *Zygodon viridissimus* (genuinus) *f. borealis* Correns came from Neuruppin, Germany, and has 4-6 septate brood-bodies which are much simpler than the Southern forms. Thus far this is the only form we have found in America, as our specimens all came from elevations varying from 2200 to 5000 feet and are distinctly boreal in distribution.



CORRENS FIG. 69.



CORRENS FIG. 70.

3. *ZYGODON GRACILIS* Wils. Berk. Handb. Brit. Mosses 219, 1863.

Leptodontium gracile De Not. Cronaca, 1868.

Amphoridium gracile De Not. Epil. 278. 1869.

Trichostomum gracile Mol. Bay, Laubm. 79. 1875.

Zygodon Nowellii Sch. Syn. 297. 1876.

Didymodon subalpinus Card. Rev. Bryol. 14: 21. 1887.

Plants in dark green dense cushions on rocks, 2-7 cm. high; stems branched and matted with brown tomentum, stout or slender when pendent; leaves crowded or distant on young branches, spirally twisted when old, spreading or recurved when moist, lanceolate, 2-2.5 mm. long, carinate; costa stout, ending below the mucronate apex, papillose on back; margins sharply serrate above, entire below, long decurrent at base; cells densely papillose, alar rectangular, clear and smooth. "Dioicous. Perichaetial leaves not differentiated. Seta 8 mm. long, exserted; capsule erect, cylindrical, striped and plicate when dry, with a narrow mouth; lid apiculate; annulus very broad, persistent; peristome double; teeth united in pairs, cilia 8, of 2 rows of papillose cells; spores .012-.014 mm. smooth. Ripe in August." Quoted from Limpricht; fruit not seen!

Easily distinguished from *Barbula reflexa* for which it is liable to be mistaken, by its sharply serrate leaves.

Type locality: Yorkshire, England. Nowell, 1856.

Distribution; England and Ireland rare! Fruit scarce. Also in Switzerland, Bavaria and the Tyrol. First discovered in America by Dr. A. J. Grout in great abundance on the faces of cliffs on Chestnut Bald, North Carolina, 6000 ft. elevation. Aug. 1907.

Exsiccatae: Wilson Musci Brit. No. 200, 1862, and Holzinger Musci Acrocarpi Boreali-Americani.

Illustrations; Limpricht Laubmoose 2: fig. 214. 1895.

LEPTODONTIUM Hpe. Linn. 20: 70, 1847.

Plants in loose, weak, yellowish-green tufts. Stems tomentose or scarcely radiculose, branched or bifurcating. Leaves not crowded, spreading or curled when dry, recurved when moist, keeled, lanceolate; base elliptic or ovate; margins entire and recurved below, irregularly serrate above; costa pectinate or ending below the apex; cells elongated rectangular at base, rounded, hexagonal above, minutely papillose on both sides. Dioicous, often sterile and propagating by buds or brittle branches. Seta erect, single or several from the long sheathing perichaetium; capsule erect, cylindric, smooth; annulus double; peristome arising below the mouth, without basal membrane; teeth smooth, nodose, bifid or split; lid conic or rostrate; calyptra?

Fifty-seven species of which 37 are American, of which 5 occur in Mexico. First record for North America of this genus.

Type species *L. squarrosum* from India and Africa.

Leptodontium excelsus (Sull.) E. G. Britton, comb. nov.

Syrrophodon? excelsus Sull. Musci All. 41. 1848.

Zygodon Sullivantii C. M. Syn. 1: 679, 1849.

Amphoridium Sullivantii L. & J. Man. 159. 1884.

Zygodon excelsus E. G. Britton Mem. Torrey Bot. Club. 4: 180. 1893, not C. M. Linn. 42: 369, 1878.

Plants slender, erect or pendent; stems dark-colored, simple or branched. 4-10 cm. long, with filiform innovations; leaves distant, light yellow at apex of stems, curled and twisted when dry, spreading when moist, 1.5-2 mm. long, carinate, lanceolate-acuminate, decurrent at base; margins entire and recurved below, serrate above; vein smooth, not keeled, ending in a subulate point, often radiculose at apex; cells thickened, minutely papillose, basal elongated, oblong and smooth, generally yellow. Flowers and fruit unknown! Propagating by rooting at the apex of the leaves or by brittle branchlets.

Type locality: Grandfather Mountain, North Carolina, Sullivant.

Distribution: On rocks and twigs on the summits of Grandfather, Chestnut Bald and Black Mountains, North Carolina. Also on spruce trees, White Top, Virginia, and mountains of Georgia, Lesquereux, 1850. Paris Index 1: 32. 1903, cites *Amphoridium Sullivantii* from "Prom. Breton." We know of no record of this species except from the Southern Alleghanies.

Exsiccatae: Sull. Musci All. 170. 1848. Sull. & Lesqx. Musci Bor. Am. No. 114. 1856. No. 169. 1865.

Illustrations: Sull. Icones Muscorum 1: 51 t, 32. 1864.

The illustrations of the winged costa, Sullivant's Icones Pl. 32, f. 13, appears to be incorrect. Mitten placed this species in his herbarium with *L. brevisetum* from Mexico, but it differs from our plant in being stouter with more squarrose leaves and different cell structure, etc.

New York Botanical Garden.

THE SYNONYMY OF THREE AMERICAN HEPATICAE.

ALEXANDER W. EVANS.

The Lindenberg herbarium of Hepaticae, now preserved in the Natural History Museum at Vienna, is justly famous for its richness in original material, many of the species described in the Synopsis Hepaticarum (1844-47) being represented by complete or partial type specimens. During the summer of 1907 Dr. C. von Keissler, who was then in charge of the collection, kindly gave me permission to examine it and to take notes upon a number of genera in which I was especially interested. As a result of this study I have reached conclusions with regard to a few species which are somewhat at variance with those accepted by other recent writers. They disagree in fact with views which I myself have previously held. One of these species, *Lejeunea uncioloba* Lindenh., has already been discussed in another paper.¹ The three species noted below are *Lejeunea laete-virens* Nees & Mont., *L. clausa* Nees & Mont., and *Frullania obcordata* Lehm. & Lindenh. Under each of these it becomes necessary to reduce to synonymy one or more species which are usually recognized as valid.

LEJEUNEA LAETE-VIRENS.

This species was based upon Cuban specimens collected at Havana by Ramon de la Sagra, and in the Synopsis Hepaticarum a second specimen from the island of Dominica is quoted, the collector's name being omitted. Stephani refers the species to the subgenus *Eu-Lejeunea* and cites both of these specimens as authentic. Both are represented in the Lindenberg herbarium, and upon studying them I found that they not only agreed with each other but that they were quite indistinguishable from the plant which I had recently described and figured as *Microlejeunea lucens* (Tayl.) Evans.² Since *Lejeunea lucens* Tayl. was published a year later than *L. laete-virens*, it must unfortunately become a synonym of the latter species. Another plant which should apparently also be reduced is *L. glaucophylla* Gottsche, originally described from sterile material collected by Beaupertuis on the island of Guadeloupe. Although the type specimen is not to be found in the Lindenberg collection the species is represented there by another Guadeloupe specimen from L'Herminier, determined by Gottsche himself. This agrees closely with Gottsche's description and figures of *L. glaucophylla* and also with the specimens of *L. laete-virens*. In *L. glaucophylla* to be sure the underleaves are said to be entire on the sides whereas in *L. laete-virens* they are sometimes unidentate. The teeth, however, are far from constant, and it is quite easy to select stems from a tuft of *L. laete-virens* where the sides of the underleaves are uniformly entire. The specimens from the Southern States which Austin many years ago referred to *L. laete-virens* are too fragmentary for positive determination but clearly represent some other species. The synonymy of *L. laete-virens*, as I now understand the species, is as follows:

¹ Torreyia 7: 225-229. 1908.

² Bot. Gazette 1: 36. 1876.

Microlejeunea laete-virens (Nees & Mont.) comb. nov.

Lejeunea laete-virens Nees & Mont. in Ramon de la Sagra, Hist. Fis. Pol. y. Natur. Cuba 9: 281. 1845.

Lejeunea lucens Tayl. Lond. Jour. Bot. 5: 399. 1846.

Lejeunea glaucophylla Gottsche, Ann. des Sc. Nat. IV. 8: 28. pl. 9, f. 15-17. 1858.

Lejeunea (*Micro-Lejeunea*) *lucens* Spruce, Hep. Amaz. et And. 288. 1884.

Lejeunea (*Eu-Lejeunea*) *lucens* Steph. Hedwigia 29: 84. 1890.

Lejeunea (*Eu-Lejeunea*) *laete-virens* Steph. l. c. 29: 87. 1890.

Microlejeunea lucens Evans, Mem. Torrey Club 8: 157. pl. 21, f. 1-10. 1902.

On trees and rocks. Type locality: Havana, Cuba (Ramon de la Sagra)-Virginia, south to Florida and west to Louisiana. Also widely distributed in tropical America, especially at low elevations.

LEJEUNEA CLAUSA.

The original material of this species was collected by Leprieur at the base of "Mount Serpent" in French Guiana. The authors described the vegetative organs only, apparently assuming that the specimens were sterile throughout. Their figure shows an unbranched fragment of a single stem and represents the underleaves as being duplicated, this appearance being due to faulty drawing. In the Synopsis Hepaticarum the type specimen is quoted and a variety β , based on a Brazilian plant collected by Bongard near Rio de Janeiro, is also described. Stephani recognizes the validity of *L. clausa* and refers it to the subgenus *Cheilo-Lejeunea*, but he separates the variety β and considers it synonymous with *L. (Euosmo-Lejeunea) parvistipula* Lindenb. & Gottsche. He bases his opinion on the specimens in the Lindenberg herbarium, which I have also examined. I find that Leprieur's material is represented by a number of female plants without perianths. In the majority of cases the inflorescences are borne on short innovating branches which may be once or twice floriferous; in rarer instances they are borne on leading branches. Upon comparing these plants with the typespecimens of *L. opaca* Gottsche, collected by Splitgerber in Surinam, I find that they agree in all essential points and thus necessitate the reduction of the latter species to synonymy. The identity of *L. clausa* and *L. opaca* was suspected many years ago by Spruce but he afterwards considered them distinct. *L. opaca* is also regarded as a valid species by Stephani and by Schiffner, both of whom refer it to *Euosmolejeunea*, and I myself have recently described and figured it as *E. opaca*.³ A portion of the original material of the variety β shows several male inflorescences, which occupy short branches as in *L. clausa*. The underleaves are very variable but, while some of them are small and squarrose as described in the Synopsis, others are larger, appressed to the stem, and more or less cordate at the base. These larger underleaves, which are undoubtedly the more normally

³ Mem. Torrey Club 8: 139. pl. 19, f. 1-11. 1902.

developed, agree closely with those found in typical *L. clausa*. I would therefore retain the variety β as a form of this species, hardly distinct enough to deserve a varietal name.

Two other species which should also be included among the synonyms of *L. clausa* are *L. commutata* Gottsche, and *L. lutea* Mont. The first of these has already been reduced by Stephani, and a portion of the type from the Nees von Esenbeck herbarium, although sterile and fragmentary, fully supports his view. *L. lutea* was described from Cuban material collected by Ramon de la Sagra and is regarded as a valid species of the subgenus *Euosmo-Lejeunea* by Stephani. I find a few fragments of the type in the Lindenberg herbarium, one of which bears a single female inflorescence, but can discover no characters which would warrant a separation from *L. clausa*. The fact that Stephani refers *L. clausa* to *Cheilo-Lejeunea*, while he places *L. opaca* and *L. lutea*, which I am unable to separate from *L. clausa*, in *Euosmo-Lejeunea* makes it evident that the relationship between these two groups is unusually close. At the same time it seems to me that *L. clausa* has more in common with *Euosmolejeunea* than with *Cheilolejeunea* and would therefore give its synonymy as follows:

***Euosmolejeunea clausa* (Nees & Mont.) comb. nov.**

Lejeunea clausa Nees & Mont. in Montagne, Ann. des Sc. Nat. II. 14: 337. pl. 20, f. 3. 1840.

Lejeunea opaca Gottsche in G. L. & N. Syn. Hep. 362. 1845.

Lejeunea commutata Gottsche, l. c. 380. 1845.

Lejeunea lutea Mont. l. c. 383. 1845.

Lejeunea (*Omphalanthus*?) *Mohrii* Aust. Bull. Torrey Club 6: 20. 1875.

Lejeunea (*Euosmo-Lejeunea*) *opaca* Spruce, Hep. Amaz. et And. 242. 1884.

Lejeunea (*Euosmo-Lejeunea*) *laxiuscula* Spruce, l. c. 244. 1884.

Lejeunea (*Cheilo-Lejeunea*) *clausa* Steph. Hedwigia 29: 80. 1890.

Lejeunea (*Euosmo-Lejeunea*) *lutea* Steph. l. c. 29: 86. 1890.

Lejeunea (*Euosmolejeunea*) *clausa* Spruce, Jour. Linn. Soc. Bot. 30: 346. 1894.

Euosmolejeunea opaca Steph. Bihang Svenska Vet.-Akad. Handl. 232: 13. 1897.

On trees, rotten logs, and rocks. Type locality: French Guiana (Leprieur). Florida and Alabama. Also widely distributed in tropical America

FRULLANIA OBCORDATA.

The material upon which *Frullania obcordata* was based was collected in "Guiana" and sent by Hooker to Lehmann. Two specimens, evidently portions of the type, are present in the Lindenberg herbarium and show an autoicous inflorescence with numerous perianths and short male spikes. They fully agree with the plant from the Southern States which Sullivant described as a new species under the name *F. caroliniana*. This species must therefore be reduced to synonymy, although it has been more or less

widely recognized as valid. Austin, in fact, made the reduction many years ago but considered the American species a variety of the African *F. brunnea* Spreng.¹ When I revised the Frullaniae of North America, north of Mexico, I was able to show that *F. caroliniana* was different from *F. brunnea*,² but as I then had no authentic specimens of *L. obcordata* for comparison I attempted to maintain our southern plant as distinct and described and figured it under Sullivant's name. It is now evident that the type specimens confirm Austin's conclusions at least in part. Another species which I would also reduce to *F. obcordata* is *F. Martiana* Gottsche, based on Brazilian specimens collected by von Martius. The material at Vienna shows more of the lobules explanate than is normal in *F. obcordata*, but this peculiarity, which is dependent upon external conditions, is not supported by any other differences of importance. The specimens also agree in being autoicous. The synonymy of *F. obcordata* follows:

FRULLANIA OBCORDATA Lehm. & Lindenb. in G. L. & N. Syn. Hep. 447. 1845,
Jungermannia obcordata Lehm. & Lindenb. in Lehmann, Pug. Plant.
6: 51. 1834.

Frullania Martiana Gottsche in G. L. & N. Syn. Hep. 448. 1845.

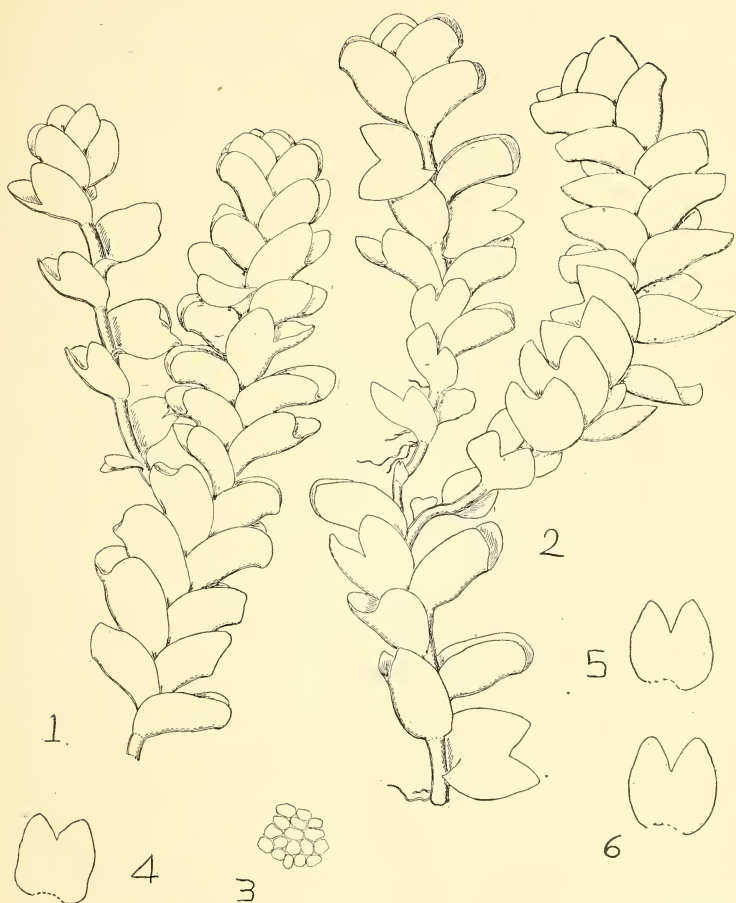
Frullania caroliniana Sulliv. Amer. Jour. Sci. and Arts II. 1: 74. 1846.

On trees. Type locality: Guiana (collector unknown). Florida to Louisiana. Also widely distributed in tropical America.

YALE UNIVERSITY.

1 Hep. Bor. Amer. 105 e. 1875.

2 Trans. Conn. Acad. 10: 33, pl. 15. 1897.



A. LORENZ. 1908.

PLATE VII. *MARSUPELLA SULLIVANTII* (DeNot.) Evans.

FIG. 1 and 2. Plants, $\times 80$.

" 3. Leaf-cells, $\times 480$.

" 4, 5 and 6. Leaves, $\times 80$.

The figures were drawn from specimens collected by the writer at Southington, Conn.

All reduced to two-fifths.



A. LORENZ, 1908.

PLATE VIII. *Marsupella sphacelata*.

SOME NEW ENGLAND MARSUPELLAE. No. 1.

ANNIE LORENZ.

As *Marsupella Sullivantii* (DeNot.) Evans has been treated in so masterly a manner by Dr. Evans in Rhodora VI, Aug. 1904, and IX, March, 1907, and the history of its present name has been traced through its tortuous synonymy, it need not be here recapitulated,

De Notaris has given the only figure thus far of *M. Sullivantii* in Comm. Soc. Critt. Ital. 1: 84. fig. 6. 1861, which is perhaps not easily accessible to the readers of THE BRYOLOGIST. Figures of *M. Sullivantii* and of *M. sphacelata* (Gies.) Dum. from which the former is derived, and therefore given together for comparison.

M. sphacelata is much the larger, and is of so extremely lax, in fact, floppy nature, as well as of so extremely delicate a texture that the leaves tear on the slightest provocation. It is fairly difficult to find a stem sufficiently perfect for delineation. It is rather dark green, with blackish tips to the leaves, while *M. Sullivantii* is purplish black, "wie verbrannt."

Further, *M. sphacelata* is a plant of high altitudes, 4000 ft. or more, and is usually practically submerged, while *M. Sullivantii* is not at all particular as to altitude, and grows on damp rocks, but never right in the water. The rhizoids of *M. Sullivantii* are upon the old parts of the plant, apparently few upon the year's growth.

Marsupella do not bear gemmae upon their leaf-tips, and they very seldom produce capsules. As a general rule, they content themselves with stolons for their propagation, except under the most favorable circumstances. The fact that these particular species are dioicous is largely responsible for the rarity of mature capsules.

All the members of this genus inhabit rocks containing potassic compounds. In Mr. Fernald's paper in Rhodora IX, Sept. 1907, the minerals he names, as composing the rocks of his Series I, will form a most excellent guide to their chosen habitat.

Hartford, Connecticut.

EXPLANATION OF PLATE VIII.

MARSURPELLA SPHACELATA (Gies.) Dum.

FIG. 1 and 2. Plants, $\times 80$.

" 3. Leaf-cells, $\times 480$.

" 4, 5. Leaves, $\times 80$.

The figures were all drawn by the writer from specimens collected in Tuckermann's Ravine by Dr. Evans.

All reduced to two-fifths.

LICHENS OF THE MOUNT MONADNOCK REGION, N. H. No. 2.

REGINALD HEBER HOWE, JR.

28. *THELOSCHISTES PARIETINUS* (L.) Norm. Three specimens, two thus labelled. Fertile. As this coast-loving lichen so far as I have observed does not occur in the region, there is some doubt in my mind that these specimens were taken about Keene. One specimen labelled "*Parietina* Keene" is *Placodium elegans*. Two specimens, made up of ten individual plants are labelled: "*Theloschistes aureola*" [(Ach.)] They appear, except one, comparable with *T. concolor*, the exception looking toward *lychnus*.

29. *THELOSCHISTES POLYCARPUS* (Ehrh.). Tuck. Two specimens, fertile, one of five separate lichens mounted together.

30. *THELOSCHISTES CONCOLOR* (Dicks.). Tuck. Five specimens. Fertile. One faded specimen is unlabelled (Fitzwilliam-common).

31. *Theloschistes concolor effuse* Tuck. Five specimens. One specimen is curiously mislabelled "*chrysophthalmus*," another "*T. lychnus*." The collection also contains three specimens labelled *Theloschistes (parietina) citrinella* (Fr.) Nyl., one with the remark, "All dust." These two specimens answer well to the diagnosis, yet may be simply undeveloped *Theloschistes* thallus. I have been unable to secure any specimens for comparison. The other two specimens undetermined are *Theloschistes chrysophthalmus* (L.) Norm. from Nantucket which are undetermined. This lichen and *T. parietinus* are most abundant and luxuriant along the coast, and these specimens show the tendency of the littoral species *Ramalina rigida* Pers. to develop large apothecia. Concord, Mass.

LICHENS COLLECTED IN THE TEHACHEPI MOUNTAINS, CALIFORNIA, JUNE, 1907,

A CORRECTION. Dr. H. E. Hasse under date May 31, 1908, writes: "I have committed two grievous errors in my paper (with above title) in the May number of THE BRYOLOGIST, by assuming authorship of two species before consulting all available literature. For *Cyphelium Carolinianum* (Tuckerm.) Hasse, read *Cyphelium Carolinianum* (Tuckerm.) A. Zahlbruckner, and for *Gyrophora phaea* (Tuckerm.) Hasse, read *Gyrophora phaea* (Tuckerm.) Herre."

Cyphelium Carolinianum (Tuckerm.) A. Zahlbruckner was published in Die Natürlichen Pflanzenfamilien, Lieferung 217, p. 84.

Gyrophora phaea (Tuckerm.) Herre was published in Proceedings of the Washington Academy of Sciences, Vol. VII, p. 366.

SULLIVANT MOSS SOCIETY NOTES.

New Members: No. 185. Mr. William B. Davis, 2006 S. College Avenue, Philadelphia, Pa. No. 186. Dr. George H. Conklin, 1204 Tower Avenue, Superior, Wis. No. 187, Mr. Harold Goddard Rugg, Dartmouth College Library, Hanover, N. H. No. 188. Mr. C. C. Kingman, 1 Harnden Street, Reading, Mass. No. 189. Mr. A. Brinkman, 215a Third Avenue, West, Calgary, Alberta, Canada. No. 190. Prof. G. R. Lyman, Dartmouth College Library, Hanover, N. H.

Note change of address. No. 184 in the July number should read Miss Helen E. Greenwood. Mr. Paul Vander Eike has removed to South Stillwater, Minnesota, and Rev. S. M. Newman, who for many years was pastor of the First Congregational Church in Washington, D. C., has recently gone to Front Royal, Virginia, as President of Eastern College.

REVISION OF NORTH AMERICAN PHILONOTIS.

Monsieur G. Dismier, whose Monograph of the Species of *Philonotis* found in France, has recently appeared, has kindly consented to revise the North American species of this genus. We have supplied him with specimens from the West Indies and Central America as well as the United States. It would help to make the record of distribution more complete if all students of North American mosses were to send him specimens. His address is 9 Avenue du Raincy (St. Maur), Seine, France.

OFFERINGS.

(To Chapter Members only. For postage).

- Mr. Edward B. Chamberlain, Cumberland Center, Maine. *Brachythecium velutinum* B. & S. Collected in Pennsylvania; *Thuidium Blandovii* B. & S. Collected in Maine.
- Mr. H. Dupret, Seminary of Philosophy, Montreal, Canada. *Eurhynchium hians* B. & S. st. Collected near Montreal.
- Mr. Severin Rapp, Sanford, Florida. *Splachnum caulescens* Dicks. (= *Tetraphodon australis* Sulliv. & Lesq.); *Camphylopus subleucogaster* Lesq. & James, st. Collected in Florida.
- Miss Mary F. Miller, 1109 M. street, N. W. Washington, D. C. *Cetraria ciliaris* Ach.; *Leucobryum glaucum* Schimp.; *Dicranum fulvum* Hook. Collected in Fairfax Co. Virginia.
- Prof. Thomas A. Bonser, Spokane College, Spokane, Wash. *Cetraria juniperina* (L.) Ach.; *Cladonia fimbriata* (L.) Fr. var. *simplex* (Weiss) Wainio. Collected in Washington.
- Mrs. Carolyn W. Harris, Mt. Meenahga, Ellenville, New York. *Bacomyces roseus* Pers.; *Buxbaumia aphylla* L. Collected in Ellenville.

TWO IMPORTANT BOOKS FOR NATURE LOVERS.

Methods in Moss Study; price, Hand-colored plates, \$3.75; Uncolored plates, \$1.25.

A Directory to the Birds of Eastern North America; price, Uncolored plates, \$6.00; with duplicate plates for coloring, \$2.50; Uncolored plates, \$2.90; with flexible covers, \$2.50. Send for circulars of these and other books. Ask your bookseller for Maynard's Books. Address, C. J. Maynard, 447 Crafts St., West Newton, Mass.

M. Thériot, 1 Rue Dicquemare, Havre (France), will shortly publish "Exsiccati" of mosses and hepatics of New Caledonia, collected by Mr. Franc, schoolmaster at Noumea. This collection which will include a good number of new species will be numbered and will appear in series of twenty-five species, at the price of \$8 per hundred, i. e., \$2 per series.

Only a small number of sets will be offered for sale. Subscribers may from now on apply to Mr. T. Thériot, 1 Rue Dicquemare, Havre, France.

FOR SALE.—78 numbers from the *Musci Americae Septentrionalis Exsiccati*, for \$3.60. Address J. Cardot, Square du Petit Bois, Charleville (Ardennes) France.

VOLUME XI

NUMBER 5



SEPTEMBER 1908



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

EDITOR

ANNIE MORRILL SMITH

ASSOCIATE

ABEL JOEL GROUT, Ph.D.

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THE BRYOLOGIST

VOL. XI

SEPTEMBER 1908

No. 5

REPORT OF THE SECOND NORWEGIAN EXPEDITION IN THE "FRAM" 1898-1902.

No. 11. Bryophyta by N. Bryhn, Kristiania, 1907.

PER AXEL RYDBERG, PH. D.

The expedition was under the command of Capt Otto Sverdrup, a well-known polar explorer, and the botanist of the same was Dr. Herman G. Simons. With a very few exceptions all the mosses were collected by the latter. The collection was very large, filling eight big boxes and numbering towards 1700 numbers of mosses alone. The report is published by the Society of Arts and Sciences of Kristiania, Norway, at the expense of The Fridtjof Nansen Fund for the Advancement of Science. It is printed in large octavo, on good paper and with large clear type. It contains 260 pages.

Dr. Bryhn states in his preface that the material was not easy to work up. In arctic regions the forms become much changed. The dry climate produces a diminution of the surface. The arctic mosses also have a tendency to produce threadlike innovations and all the leaves are usually short. Most of the species are found in diminutive forms which give the impression of starved dwarfs. Something rather extraordinary is the high coloration of the cell membranes of the leaves, which are yellow, red, brown or crimson, apparently so as to give protection against the strong light day and night during the short period of growth. Very few species produce fruit, in general only the acrocarpous mosses, especially the bisexual species of the genus *Bryum*. The fruits that had been perfected had often been damaged or altogether torn off. The snow-sparrow, *Emberiza nivalis*, is probably to blame for this, as according to Prof. Berggren, its food to a great extent consists of the fruits of mosses. Very few of the arctic mosses are found in mass or in pure growth. Usually they appear in mixed tussocks, some of these containing even twenty to thirty different species. It often happened that different species growing in the same tussock had taken upon themselves the same habit so that all resembled each other, and it was only under the microscope that it was possible to distinguish them.

In working up the collection Dr. Bryhn had two specialists as collaborators, viz. Mr. B. Kaalaas, in the Hepatics, and the late Mr. E. Ryan in the genus *Bryum*. The new species in these groups were published under joint authorship with these gentlemen. At the end of the preface is given a list of the most important literature used in working up the collection.

The report proper is divided into three parts: First, an account of the different places visited and where collections were made, and lists of species gathered at each place. Second, a systematic annotated catalogue of the whole collection, including notes on distribution, habitat, etc., and

descriptions of thirty five new species and nineteen new varieties. Third, a list of all the species that had been found in each number of the exsiccata. In No. 533, for instance, he had found twenty-nine, in No. 546, twenty-five species and varieties, and in 951 not less than thirty-two species. At the end of the report are two plates illustrating the leaves of the following species: *Gymnostomum laevi* Bryhn, *Fissidens arcticus* Bryhn, *Polytrichum fragile* Bryhn, *Orthothecium acuminatum* Bryhn, *Brachythecium salebrosum* var. *binervium* Bryhn, *Hypnum tundrae* (Arn.) Joerg, and *Hypnum hyperboreum* Bryhn.

The first place that was touched by the expedition was Egedesminde or Godhavn, Greenland, at about lat. 69 deg. During the short stay about forty species of bryophytes were gathered. Most of these were common and well known arctic species. The following were, however, of special interest; *Lophozia Baueriana*, new to the western hemisphere; *Cynodontium strumiferum*, new to arctic America, and *Hypnum pseudorufescens*, before known only from two or three places in Europe.

The second place where bryophytes were collected was at Foulkeffjord in Northwest Greenland, at lat. 78 deg. 20 min. Here were collected for the first time the following new species: *Lophozia harpanthoides*, *Plagiochila arctica*, *Fissidens arcticus* and *Polytrichum fragile*. A list of eighty-six species collected there is given.

Next in turn came Ellesmere Land, where the expedition passed the first winter. From Framshavn, the place of wintering, as a center several excursions were made during the fall of 1898 and the summer of 1899, to the coasts of this land and the neighboring islands at lat. 78 deg. 40 min.-79 deg. Here were discovered the following new species; *Diplophyllum incurvum*, *Gymnostomum laeve*, *Lophozia violascens*, *Bryum gemmaceum*, *B. subfoveolatum*, *B. cyclophylloides*, *B. pertenellum*, *Orthothecium acuminatum* and *Hypnum hyperboreum*. Of these the first two were rather common and the following very scarce. In all two hundred and eleven species were collected.

From Smith's Sound the course was directed towards Jones' Sound, where North Lincoln was touched. A stay was made at Framjord, situated at lat. 70 deg. 20 min. Eighty-three species were collected, of which none were new. The journey was continued in the fall of 1899 along Jones' Sound. King Oscar's Land was discovered. The expedition was forced to winter here three times. Many excursions were made and each of the many fjords was more or less satisfactorily investigated. Not less than two hundred and thirty-three species of bryophytes were collected and not less than seventeen new species discovered. These were: *Scapania Simmonsii*, *Funaria polaris*, and the following species of *Bryum*: *hyperboreum*, *laxirete*, *liliputanum*, *parvum*, *brachythecium*, *cancelliforme*, *corioideum*, *angustidens*, *semiovatum*, *Simmonsii*, *glomeratum*, *nodosum*, *densum*, *penduliforme*, and *teretinerve*.

From King Oscar's Land were made botanical excursions to the Islands of North Devon and North Kent. On the former, situated at about lat. 76 deg. and on small neighboring islands, Castle Island and Devil's Island, sixty-four species were collected, of which the very curious *Bryum paganum*

was new. To North Kent, situated outside King Oscar's Land at about lat. 76 deg. 50 min. was made only one excursion, on which fifty-one species were collected, all on the high table-land three hundred to three hundred and fifty meters above the sea level.

During the whole expedition were collected about two hundred and ninety species. Besides the new species mentioned above, there is also given the description of *Lophozia Murmanica* which was known before but had remained undescribed, and three varieties were raised to specific rank under the names of *Marsupella arctica*, *Cephalozia verrucosa* and *Cinclidium polare*. In all thirty-five new species and twenty-two new varieties were added to science and nineteen new to the Western Hemisphere. Something surprising was the finding of several species which hitherto had been regarded as more southern plants, as *Lophozia marchica*, *Cephalozia biloba*, *Cynodontium gracilescens*, *Fissidens exiguus*, *Aloina rigida*, *Tayloria acuminata*, *Heterocladium Macounii* and *Hyphnum pseudorufescens*.

The following species are also new to the western hemisphere: *Lophozia murmanica*, *Cephalozia biloba*, *Diplophyllum gymnostomophilum*, *Lophozia Baueriana*, *Rhacomitrium brevisetum*, *Bryum autumnale*, *B. opdalense*, *B. curvatum*, *B. subtumidum*, *B. salinum*, *B. stenodon*, *B. lapponicum*, *B. Graefianum*, *B. campylocarpum*, *B. Fridtzii*, *B. confluens*, *Aulaconium acuminatum*, *Hyphnum latinerve* and *H. pseudorufescens*.

The new species and varieties described in the report and those supposed to be new to the continent, seventy-six in all, were collected at the following stations:

HEPATICAE.

MARSUPELLA ARCTICA (Berggr.) Bryhn & Kaalaas sp. n.

Sarcoscyphus emarginatus (Ehrh.) Hartm. v. *arcticus* Berggr. Ellesmere Land; Cape Rutherford and Cape Viole. King Oscar's Land; Gaasefjord.

APLOZIA ATROVIRENS GRACILIS Bryhn & Kaalaas var. nov.

King Oscar's Land; Gaasefjord and Landsend. Ellesmere Land; Beitstadfjord, at lat. 79 deg.

LOPHOZIA HARPANTHOIDES Bryhn & Kaalaas sp. nov.

North Lincoln; Framfjord, King Oscar's Land; Havnefjord, Gaasefjord, Reindeer Bay, Excrement Bay and Land's End. North Kent. Northwest Greenland; Foulkefjord. Ellesmere Land; Framshavn, Glacial Valley, Lastrea Valley, Bedford Pim Island, Skraelling Island and Cape Rutherford, lat. 78 deg. 50 min.

LOPHOZIA MURMANICA Kaalaas sp. nov.

King Oscar's Land; Gaasefjord. Ellesmere Land; Cape Rutherford, lat. 78 deg. 50 min. (Type from Litsa, Murmanic, Lappland.)

LOPHOZIA VIOLASCENS Bryhn & Kaalaas sp. nov.

King Oscar's Land; Havnefjord. Ellesmere Land; Bedford Pim Island.

LOPHOZIA BAUERIANA Schiffner.

West Greenland; Egedesminde, North Lincoln; Framfjord. Ellesmere Land; Framshavn, and Glacier Valley. (Type from Sarjek, Swedish Lappland).

LOPHOZIA QUADRILOBA HETEROPHYLLA Bryhn & Kaalaas var. nov.

North Lincoln; Framfjord, King Oscar's Land; Havnefjord, Reindeer Bay, Gaasefjord and Land's End. North Kent; Ellesmere Land; Framshavn, Cape Rutherford, Lastraea Valley, Bedford Pim Island.

PLAGIOCHILA ARCTICA Bryhn & Kaalaas sp. nov.

North Lincoln; Framfjord, King Oscar's Land; Havnefjord, Gaasefjord and Reindeer Bay. North Kent; Northwest Greenland; Foulkefjord. Ellesmere Land; Cape Rutherford and Beitstadfjord, lat. 70 deg.

CEPHALOZIA BICUSPIDATA ARCTICA Bryhn & Kaalaas var. nov.

Ellesmere Land; Bedford Pim Island, Glacial Valley, Cape Viole, Cape Rutherford and Beitstadfjord.

CEPHALOZIA BILOBA Lindb. King Oscar's Land; Havnefjord (Known before only from Stavanger, Norway and from Helsingfors, Finland).

CEPHALOZIA BRYHNII Kaalaas.

Ellesmere Land; Cape Rutherford, lat. 78 deg. 50 min. (Known from Norway and France; previous northern limit lat. 70 deg.).

CEPHALOZIA VERRUCOSA (Jens.) Bryhn & Kaalaas sp. nov.

CEPHALOZIA DIVARICATA (Franc.) Dum. v. *verrucosa* C. Jens.

North Lincoln; Framfjord, King Oscar's Land; Havnefjord, Gaasefjord, Reindeer Bay, Excrement Bay, Land's End and Isachsen's Fjord. Northwest Greenland; Foulkefjord. Ellesmere Land; Framshavn, Glacial Valley, Cape Viole, Lastraea Valley, Bedford Pim Island, Cocked Hat Island, Cape Rutherford, Eskimopolis, Beitstadfjord, Skraeling Island.

BLEPHAROSTOMA TRICHOPHYLLUM BREVIRETE Bryhn & Kaalaas var. nov.

King Oscar's Land; Excrement Bay. Ellesmere Land; Framshavn, Cape Rutherford, Eskimopolis, Skraeling Island.

DIPLOPHYLLUM GYMNSTOMOPHILUM Kaalaas.

King Oscar's Land; Havnefjord and Isachsen's Fjord, lat. 78 deg. (Known before only from Scandinavia as far north as 66 deg. 30 min.).

DIPLOPHYLLUM INCURVUM Bryhn & Kaalaas sp. nov.

North Lincoln; Framfjord. King Oscar's Land; Havnefjord, Moskusfjord, Gaasefjord, Reindeer Bay. North Kent. Ellesmere Land; Framshavn, Bedford Pim Island, Lastraea Valley, Glacier Valley, Cape Rutherford, Beitstadfjord.

SCAPANIA SIMMONSII Bryhn & Kaalaas sp. nov.

King Oscar's Land; Havnefjord, Gaasefjord.

MUSCI.

GYMNOSTOMUM LAEVE Bryhn sp. nov.

King Oscar's Land; Havnefjord, Gaasefjord, Excrement Bay. North Kent, Ellesmere Land; Beitstadfjord and between Fort Juliane and Mt. Koela-Paulsen, lat. 79 deg.

FISSIDENS ARCTICUS Bryhn sp. nov. (Tab. I, Fig. 2).

King Oscar's Land; Gaasefjord, Landsend and Isachsen's Fjord, North West Greenland; Foulkefjord. Ellesmere Land; Lastraea Valley.

SCHISTIDIUM APOCARPUM OVATUM Bryhn var. nov.

North Lincoln; Framfjord, King Oscar's Land; Havnefjord. Ellesmere Land; Framshavn, Beitstadfjord and between Fort Juliane and Mt. Koela-Paulsen.

SCHISTIDIUM APOCARPUM ABRUPTICOSTATUM Bryhn var. nov.

King Oscar's Land; Havnefjord.

SCHISTIDIUM APOCARPUM SCABRIUS Bryhn var. nov.

King Oscar's Land; Gaasefjord. North Kent.

RHACOMITRIUM BREVISETUM Lindb.

Ellesmere Land; Beitstadfjord at lat. 79 deg. (Before known only from the Island of Sachalin, lat. 52 deg.).

FUNARIA POLARIS Bryhn sp. nov.

King Oscar's Land; Havnefjord, lat. 76 deg. 30 min.

BRYUM AUTUMNALE Limpr.

King Oscar's Land; Havnefjord, Reindeer Bay, Gaasefjord. Ellesmere Land; Glacial Valley, lat. 78 deg. 45 min. (Before known only from Norway).

BRYUM HYPERBOREUM Bryhn & Ryan sp. nov.

King Oscar's Land; Moskusfjord and Gaasefjord, lat. 76 deg. 30 min.

BRYUM LAXIRETE Bryhn & Rynn sp. nov.

King Oscar's Land; Havnefjord and Gaasefjord, lat. 76 deg. 30 min.

BRYUM LILIPUTANUM Bryhn & Ryan sp. nov.

King Oscar's Land; Havnefjord, lat. 76 deg. 30 min.

BRYUM PARVUM Bryhn & Ryan sp. nov.

King Oscar's Land; Havnefjord, lat. 76 deg. 30 min., together with the preceding.

BRYUM BRACHYTHECIUM Bryhn & Ryan sp. nov.

King Oscar's Land; Gaasefjord, lat. 76 deg. 50 min.

BRYUM GEMMACEUM Bryhn & Ryan sp. nov.

Ellesmere Land; Framshavn, lat. 78 deg. 45 min.

BRYUM CORIOIEDEUM Bryhn & Ryan sp. nov.

King Oscar's Land; Moskusfjord, lat. 76 deg. 30 min.

BRYUM ANGUSTIDENS Bryhn & Ryan sp. nov.

King Oscar's Land; Gaasefjord, lat. 76 deg. 30 min.

BRYUM SEMIOVATUM Bryhn & Ryan sp. nov.

King Oscar's Land; Moskusfjord, lat. 76 min. 30 min.

BRYUM CANCELLIFORME Bryhn & Ryan sp. nov.

King Oscar's Land; Gaasefjord, lat. 76 min. 30 min.

BRYUM OPDALENSE Limpr.

Ellesmere Land; Glacial Valley, lat. 78 deg. 45 min. (Before known only from Norway).

BRYUM OPDALENSE CARNEUM Bryhn & Ryan var. nov.

King Oscar's Land; Gaasefjord.

BRYUM CURVATUM Arnell & Kaurin.

Ellesmere Land; Glacial Valley, lat. 78 deg. 45 min. (Before known only from Norway).

BRYUM SUBTUMIDUM Limpr.

Ellesmere Land; Framshavn, lat. 78 deg. 45 min. (Before known only from Norway).

BRYUM SALINUM Hagen.

Northwest Greenland; Foulkefjord, lat. 78 deg. 20 min. (Before known only from Scandinavia and Denmark).

BRYUM STENODON Hagen.

King Oscar Land; Gaasefjord, lat. 76 deg. 30 min. (Before known only from Norway).

BRYUM LAPPONICUM Kaurin.

Northwest Greenland; Foulkefjord, lat. 78 deg. 20 min. (Before known only from Scandinavia).

BRYUM SUBFOVEOLATUM Bryhn & Ryan sp. nov.

Ellesmere Land; Framshavn, lat. 78 deg. 45 min.

BRYUM GRAEFIANUM Schlieph.

King Oscar's Land; Gaasefjord, lat. 76 deg. 30 min. (Known from Northern and Central Europe).

BRYUM SIMMONSII Bryhn & Ryan sp. nov.

King Oscar's Land, lat. 76 deg. 30 min.

BRYUM CAMPYLOCARPUM ARCTICA Bryhn & Ryan sp. nov.

King Oscar's Land; Moskusfjord, lat. 76 deg. 30 min. (The species is known only from Norway).

BRYUM OENIUM SUBELIMBATUM Bryhn & Ryan var. nov.

King Oscar's Land; Vendomkap. North Lincoln; Framfjord. Ellesmere Land; Bedford Pim Island and between Fort Juliane and Mt. Koela-Paulsen, lat. 79 deg.

BRYUM AGATTUENSE Philibert.

King Oscar's Land; Gaasefjord, lat. 76 deg. 30 min. (Before known only from Alaska).

BRYUM NODOSUM Bryhn & Ryan sp. nov.

King Oscar's Land; Havnefjord, lat. 76 deg. 30 min.

BRYUM GLOMERATUM Bryhn & Ryan sp. nov.

King Oscar's Land; Gaasefjord, lat. 76 deg. 36 min.

BRYUM NITIDULUM FENESTRATUM Bryhn & Ryan var. nov.

King Oscar's Land; Havnefjord, lat. 76 deg. 30 min.

BRYUM PERTENELLUM Bryhn & Ryan sp. nov.

Ellesmere Land; Eskimopolis, lat. 78 deg. 50 min.

BRYUM DENSUM Bryhn & Ryan sp. nov.

King Oscar's Land; Gaasefjord, lat. 76 deg. 30 min.

BRYUM TERETINERVE Bryhn & Ryan sp. nov.

King Oscar's Land; Gaasefjord, lat. 76 deg. 30 min.

BRYUM CYCLOPHYLOIDES Bryhn & Ryan sp. nov.

Ellesmere Land; Eskimopolis, lat. 78 deg. 50 min.

BRYUM PAGANUM Bryhn & Ryan sp. nov.

North Devon, lat. 76 deg.

BRYUM VENTRICOSUM SUBTERES Bryhn & Ryan var. nov.

King Oscar's Land; Havnefjord.

BRYUM CRISPULUM DENSIFOLIUM Bryhn & Ryan var. nov.

King Oscar's Land; Gaasefjord; Ellesmere Land; Framshavn.

- BRYUM TOMETOSUM SUBSPHAERICUM Bryhn Ryan var. nov.
King Oscar's Land; Moskusfjord.
- BRYUM ARCTICUM LATIANNULATUM Bryhn & Ryan var. nov.
King Oscar's Land; Havnefjord.
- BRYUM PENDULUM STRIOLATUM Bryhn & Ryan var. nov.
King Oscar's Land; Gaasefjord.
- BRYUM PENDULUM ARCTOBRYOIDES Bryhn & Ryan var. nov.
King Oscar's Land; Moskusfjord.
- BRYUM FRIDTZII Hagen.
King Oscar's Land; Gaasefjord. Ellesmere Land; Glacier Valley, lat. 78 deg. 45 min. (Before known only from Norway).
- BRYUM PENDULIFORME Bryhn & Ryan sp. nov.
King Oscar's Land; Havnefjord, lat. 76 deg. 30 min.
- BRYUM CONFLUENS Joerg.
Ellesmere Land; Glacier Valley and Cape Rutherford. (Before known only from Norway).
- MINIUM SUBGLOBOSUM SUBELIMBATUM Bryhn var. nov.
King Oscar's Land; Gaasefjord. Cardigan Strait; Devil's Island.
- CLINCLIDIUM POLARE (Kindh.) Bryhn sp. nov.
C. arcticum Breggr. and *C. arcticum* subsp. *polare* Kindb.
King Oscar's Land; Havnefjord, Moskusfjord, Gaasefjord, Excrement Bay, Isachsen's Fjord. North Kent. North Lincoln; Framfjord. Ellesmere Land; Framshavn, Lastraea Valley, Bedford Pim Island and Cape Rutherford.
- AULACOMNIUM ACUMINATUM (Arn. & Kindb.) Par.
North Lincoln; Framfjord. King Oscar's Land; Havnefjord, Moskusfjord, Gaasefjord, lat. 76 deg. 30 min. (Before known only from Siberia).
- TIMMIA NORVEGICA EXCURRENS Bryhn var. nov.
King Oscar's Land; Havnefjord and Gaasefjord.
- POLYTRICHUM FRAGILE Bryhn sp. nov. Tab. I, fig. 3.
Northwest Greenland; Foulkefjord, lat. 78 deg. 20 min. Ellesmere Land; Cape Viole, Lastraea Valley, Bedford Pim Island and Cocked Hat Island, lat. 78 deg. 50 min.
- ORTHOTHECIUM ACUMINATUM Bryhn sp. nov. Tab. I, fig. 4.
King Oscar's Land; Gaasefjord, Reindeer Bay. Ellesmere Land; Bedford Pim Island, lat. 78 deg. 45 min.
- HYPNUM POLARE LEPTODICTYON Bryhn var. nov.
King Oscar's Land; Gaasefjord.
- HYPNUM SARMENTOSUM ACUMINATUM Bryhn var. nov.
North Lincoln, Framfjord. Ellesmere Land; Cape Rutherford.
- HYPNUM LATINERVE Arnell.
Ellesmere Land; Framshavn, lat. 78 deg. 45 min. (Before known only from Siberia).
- HYPNUM PSEUDORUFESCENS Warnst.
West Greenland; Egedesminde, lat. 69 deg. (Known from Norway and Bohemia).
- HYPNUM HYPERBOREUM Bryhn sp. nov. Tab. II, fig. 3.
Ellesmere Land; Stahlknects Island, lat. 78 deg. 40 min.
- HYPNUM REVOLUTUM SUBJULACEUM Bryhn var. nov.
North Devon; Havhestberg. North Lincoln. King Oscar's Land; Havnefjord, Gaasefjord, Sydkapfjord and Vendomkap. Ellesmeer Land; Cape Viole, Lastraea Valley, Cape Rutherford and Skraeling Island.
New York Botanical Garden.

LICHEN NOTES No. 6.

A List of the Parmelia Species of British North America, contained in the Herbarium of the Canadian Government at Ottawa, with Descriptions of those Species not Mentioned in Tuckerman's Synopsis, and of Several New Forms.

G. K. MERRILL.

It is thought best to make this list the vehicle for description of a number of *Parmelia* forms not commonly recognized by American students. Differentiated by Nylander for the most part, these unfamiliar names may be said to owe their origin to a refinement of analysis on the part of those proposing them, for groups hitherto viewed as individual.

Tuckerman viewed the genus *Parmelia* through the eyes of Fries, and giving no credence to the value of reagents in dissociating species and varieties, we find in his Synopsis what appears to be an unwarranted neglect of the labors of the European workers for the period just prior to its publication. The so-called "chemical criteria" have received almost universal adoption in Europe, and believing in their value ourselves, we have together with the names cited, recorded the reaction for each. This is done with the purpose of placing in the hands of our students, particularly those of the Northern United States, a working compendium. No other Lichen genus offers more instructive or useful material for the employment of reagents than *Parmelia*, and while contradictory results are sometimes met with, these are no more diverse than are the morphological contrasts for a given species. We unhesitatingly deplore the practice of establishing species on purely chemical grounds, but affirm our belief in the reasonableness of making chemical discrepancies as important as variation in size of spores, presence or absence of isidia, soredia, cilia, etc., in the separation of varieties and forms. Knowledge of American *Parmelia* species in this country is as yet very rudimentary. This is in part due to the very low ebb marking the interest in Lichenology, but principally to the influence of Tuckerman's disposition of the species, and to the fact that the examples in our herbaria are for the most part identified in accordance with his views. But nineteen species of *Parmelia* were described in the Synopsis, while the names of more than a hundred are recorded in various foreign publications as having been collected in North America. The majority of these are entirely unknown to our collectors, although it is safe to say that our larger herbaria contain examples in unsuspected profusion. The time seems at hand to attempt a widening of our acquaintance with *Parmelia*, and to emancipate ourselves from the limits prescribed by Fries.

Some explanation of the symbols, and method of employing the reagents, seems desirable. K is made to stand for a solution of potassic hydrate in water (one in two, by bulk). C a solution of chloride of lime (saturated). If on application of K or C to the surface of a plant a distinct yellow coloration is immediately noted an affirmative sign + is placed after the symbol; if no color is produced a negative —, thus K+ or C— as the case may be. Where the symbol reads as in *P. physodes* K⁺, it means that

the solution produces a coloration on the surface but none on the medulla (me.). Application to the medulla is made by abrading the surface until the tissue just beneath the cortex is exposed, then wetting with a drop of the solution. Me. K (C) refers to the practice of first applying K and following it on the same spot with C. The value of this test depends on an attentive eye, as the reaction is less positive than with K or C alone. The usual coloration produced with K is a distinct yellow, orange-yellow or greenish-yellow. When the color is faint it is indicated by f. following the + sign, and when other colors are developed it is usual to indicate same at length. A tardy response to test is not to be considered at all, except in the case of those plants first showing a yellow, followed after a time with some other color, usually red, as in *P. perforata*. This is symbolized for the species mentioned with $K^+_{+} >$ red, or in the case of *P. subquercifolia* $K^+_{+} >$ red. Solutions should be kept in tightly stoppered dark colored bottles. Apply with a dropper or glass brush.

Parmelia Ach.

SUB-GENUS MENEGAZZIA (MASS.) WAIN.

P. physodes (L.) Ach. Methodus p. 250.

Reaction K^+_{+} , me. K (C) +orange.

On fences, old boards, dead wood, trunks of trees, and rocks.

3652, Montmorency River, Que.; 684, Lake Superior; 685, Cape Breton; 667, Bay du Chaleur; 680, Dent's Lake, B.C.: 3305, Sable Is., N. S.: 674, Belleville, Ont.; 672, Nipigon River, Ont.: 675, Lake Nipigon; 666, Jumping Pound Creek, Alta.: 665, Elbow River, Alta: collected by John Macoun. 662, Lat. 61°, Long. 104°, J. W. Tyrrell; 664, Clearwater Lake, Labrador, A. P. Low, and Vancouver Is., Dawson.

P. physodes f. *PLATYPHYLLA* (Ach.) Merrill.

P. physodes var. *platyphylla* Ach. Methodus, p. 251.

Laciniae broader than in the type, appearing to merge at the centre, the surface rugose and complicate, and the lobes crenate, sometimes sorediate at the apices.

On wood and rocks.

682, Comox. V. I. (typical); 681, Victoria, V. I.; 688, Canaan Forks, N.B., John Macoun. The last two numbers are intermediate states between the present and type, and seem to negative the varietal rank given the form by Acharius

P. physodes f. *LABROSA* (Ach.) Arn. Lich. Exs. No. 297.

P. physodes var. *labrosa* Ach. L. U. p. 493.

Differs from the type in that the laciniae are recurved-ascendent at the apices, and slightly dilated and sorediate on the under surface.

On rocks, fences and trunks of trees.

3497, Algonquin Park, Ont.: 661, Ottawa, Ont.: 676, Brighton, Ont.; 697, Victoria, V. I.: 3656, Cap. à. L'Aigle, Que., John Macoun.

A very distinct form of *P. physodes* when found with the characters well marked, but intermediate states are common. The form seems to attain its greatest perfection on the small branches and twigs of coniferous trees.

P. PHYSODES f. **subisidioides** Merrill f. nov.

Like depressed conditions of the type, but interruptedly isidio-furfuraceous.

On rocks and old logs.

3635, Laggan, Alta.; 687, Elbow River, Rocky Mts. J. Macoun.

P. PHYSODES var. *ENTEROMORPHA* (Ach.) Tuck. Syn. Lich. N. E. p. 28.

P. enteromorpha Ach. Methodus, p. 252.

On trees.

695, Hastings, B. C.; 689, Victoria, B. C.; 688, 692, 693, 694, Vancouver Is. J. Macoun.

P. PHYSODES *ENTEROMORPHA* f. **rugosa** Merrill f. nov.

Differs from var. *enteromorpha* in being constipate-rugose, somewhat flavescens in color and with the laciniae more or less black-edged as in var. *vittata*.

On decayed wood.

696, McLeod's Lake, B. C. J. Macoun.

Comparable with *P. lugubris* Pers. in Gaudich. Uran. p. 196, which Nylander Syn. p. 401 cites as a form of var. *vittata*. The specimen fruited, the apothecia attaining to 3 cent. in diameter. While specimens of *P. physodes* are often found with wrinkled or rugose thalli, that character is more infrequent in var. *enteromorpha* than in the other forms.

P. PHYSODES var. *VITTATA* Ach. Methodus p. 252.

On earth.

588, Vancouver Is., J. Macoun, sub-nodulose and intermediate with var. *enteromorpha*; 698, St. Paul's Is., Behring Sea, J. M. Macoun, denigrate and suggests *P. austerodes* Nyl. The specimens of var. *vittata* from the west coast of America contained in our herbarium are for the most part intermediate states uniting the characters of both vars. *enteromorpha* and the present. There seems to be no good reason for making a species of *vittata* notwithstanding asserted minute differences.

P. PHYSODES *VITTATA* f. *HYPOTRYPODES* Nyl. in Flora 1875, p. 106.

Differing but little from var. *vittata* except in being more divided with the laciniae less linear. In typical examples the lobes at and sometimes superficially near the apices are provided with conspicuous white dilated soredia.

On rocks, trees and mosses.

669, Lake Nipissing, Ont.; 612, 694, St. Anne's des Monts River, Que., J. Macoun; 617, Lake Mistassini N. E. T., J. M. Macoun.

Our examples are without the perforations of the European forms and the apices of the laciniae do not gape as in forma *labrosa* of the type. It is probable that most of the forms identified as var. *vittata* and cited from eastern N. America may be placed here.

P. PERTUSA (Schrank.) Schaer. Lich. Helvet. Spiclg. II. p. 457.

Reaction K^+ , C^- .

On old logs and trees.

683, Hastings, B. C.; 671, Ottawa, Ont., J. Macoun; 679, New Westminster, B. C. Mr. Law.

Subgenus Anzia Nyl.

SECTION EUANZIA (MÜLL. ARG.) HUE.

P. COLPODES Ach. Methodus p. 251.

Reaction K_2^+ .

702, on trees, Central Ontario Junction, Ont. J. Macoun.

Subgenus Euparmelia Nyl.

SECTION MELAEOPARMELIA HUE.

P. STYGIA (L.) Ach. Methodus p. 203.

Reaction none.

On rocks.

836 and 192, Lower Arrow Lake, B. C.; 198, Jumping Pound Creek, Alta. J. Macoun.

P. TRISTIS (Web.) Nyl. Enum. Lich. p. 105.

Reaction none.

72, on rocks, summit of Mt. Benson, V. I. J. Macoun.

Cetraria tristis (Web.) Fr. of Tuckerman's Synopsis, is synonymous.

If *P. lanata* be admitted to this genus, it is difficult to reject the present.

P. LANATA Nyl. Syn. p. 406.

Wainio Rev. Lich. in herb. Linn. asserv. states that *Lichen lanatus* L. is *Ephebe pubescens* Ach.

Reaction none.

3010, on earth, summit of Mt. Benson, V. I., growing mixed with *P. tristis*. J. Macoun.

Spores in West American specimens alectoroid and the plant perhaps belongs with *Bryopogon*.

SECTION XANTHOPARMELIA WAIN.

P. CONSPERSA (Ehrh.) Ach. Methodus p. 205.

Reaction K_2^+ reddish, C_2^- .

On rocks.

753, Lower Arrow Lake, B. C.; 16, Montmorency River, Que.; 754, Hastings, B. C.; 747, Black Water, B. C.; 761, Victoria, V. I.; 704, St. Anne's des Monts River, Que.; J. Macoun. 757, Nevers Rapids, N. B. Brittain; 758, Peterboro Co., Ont. H. C. Walker.

P. CONSPERSA f. IMBRICATA Mass.

Laciniae short, narrowed and imbricate-complicate.

705, on trees, Carleton, N. B. G. U. Hay.

P. CONSPERSA f. STENOPHYLLA Ach.

P. conspersa var. *stenophylla* Ach. Methodus, p. 206.

Laciniae narrower and more divided than in f. *imbricata*, imbricated and even panniform.

On rocks.

776, Cape Breton Is.: 767, Nipigon River, Ont. J. Macoun.

P. CONSPERSA f. *ISIDIATA* (Anzi) Hue Lich. Ex. n. 702.

The thallus except at the circumference constipate-isidiose, the exciple likewise clothed.

On rocks.

122, Cap à l'Aigle, Que. ; 73, Algonquin Park, Ont. J. Macoun.

P. MOLLUSCULA Ach. Lich. Univ. p. 492.

Reaction me K+ orange.

On earth.

761, Old Wives Creek, Assa.: 760, Bow River Pass, Ry. Mts.: 762, Crows Nest Pass, Ry. Mts. J. Macoun. No. 316 D. N. Am. Li. labelled *P. conspersa stenophylla*, belongs here.

P. CENTRIFUGA Ach. Methodus, p. 206.

Reaction me K—.

On rocks.

3822, Blanc Sablon, Labrador, A. E. Waghorne: 775, Diggs Is., Hudson Straits, R. Bell: 752, Lat. 61°, Long. 104°, J. W. Tyrrell: 773, Clearwater Lake, Labrador, A. P. Low: 774, Tadousac, Can.; 756, Lower Arrow Lake, B. C.; 769, Summit Lake, Que. ; 772, Lake Nipigon; 770, Lake Superior, J. Macoun.

Commonly found only infertile but some of the specimens well fruited. Easily distinguishable from *P. conspersa* which it somewhat resembles by its blackish-brown color below, in *P. conspersa* reddish-brown.

P. DIFFUSA (Web.) Th. Fr. Arct. p. 60.

Reaction K—.

On bark of trees and dead wood.

3665, Laggan, Alta.: 3666, Yoho Pass, B. C.; 780, Jumping Pound Creek, Alta.; 777, Lower Arrow Lake, B. C.; 130, Banff, Ry. Mts.; 785, Cape Breton, J. Macoun. No. 4023 on old logs, Montmorency Falls, Que., J. Macoun, is provided with whitish soredia facies. *P. hyperoptam*, synonymous with *P. ambigua* of Tuckerman's Synopsis, but the above is the old name and should be conserved.

P. HYPEROPTA Ach. Synopsis, p. 208.

Reaction K⁺.

On old logs and fences.

3664, Yoho Pass, B. C.; (characteristic) J. Macoun: 786, Cape Breton J. Macoun, strongly resembles *P. diffusa* but is cinereo-glaucous with whitish soredia; 3820, Labrador, Waghorne.

This is *P. ambigua* var. *albescens* of Tuckerman's Synopsis. The Acharian name seems to have priority over *albescens*, Wallr. It is a curious fact that dealbate conditions of *P. diffusa* are often found growing with that plant, almost impossible of separation. But typical corticoline *P. hyperopta* is in our experience unaccompanied by *P. diffusa*. It will not be improper to use the designation *albescens* for the whitish states of *P. diffusa*.

SECTION HYPOTRACHYNAE WAIN.

GROUP CYCLOCHEILAE Arn.

P. OLIVACEA (L.) Ach. Methodus, p. 213.

Reaction me C—.

On tree trunks and branches of trees.

3636, Laggan, Alta.; 3660 and 3661, Montmorency River, Que.; 7119 Nipigon River, Ont.; 707, St. Anne's des Monts River, Que.; 710, Rock-Mountains; 708, Kanaskis, Ry. Mts.; 712, Revelstoke, Ry. Mts.; 719, Jumping Pound Creek, Alta.; 716, Victoria, V. I., J. Macoun; 715, Athabasca Rivir. J. M. Macoun; 714, Canaan Forks, N. B., J. Moser.

The plant here listed is that form of the *olivacea* group marked by its distinctly rugulose thallus. This and the lack of medullary reaction will serve to distinguish. Tuckerman appears to have made no effort to discriminate the many forms of affinity with the above established by Nylander, but in large series of specimens that author's differentiations will appear to be well founded and reasonable. It may be noted that passage forms between the various *olivacea* species are seldom met with, and each seems to be fairly constant to its cited characters.

P. GLABRA Schaer. exs. No. 370.

Reaction K^+ , C^+ rose.

Thallus membranaceous, orbicular, loosely attached, bright brown or greenish olivaceous, laciniae more or less transversely rugulose, commonly rounded at the apices or slightly crenulate, smooth and even shining; below concolorous or blackish and slightly rhizinose. Apothecia concave or plane, concolorous, the exciple slightly crenulate and usually papillate. Spores $\frac{11-18}{7-8} \mu$. Not previously listed from America.

718, on trunks, Ottawa, J. Macoun.

P. CONSPURCATA (Schaer.) Wain. Notulae de syn. lichenum in Medd. of Soc. pro. Faun. et Fl. fennica, Feb. 1886.

P. *olivacea* a. *corticola* b. *conspurcata* Schaer. exs. no. 371.

Reaction K^- , C^+ rose, faint.

Thallus membranaceous, orbicular, appressed but not closely attached, olivaceous-brown and opaque, laciniae more or less confusedly rugulose, the tips of the lobes rounded and crenate with the upper surface whitish or yellowish punctate-sorediate, these dispersed over the thallus centrally, but particularly following the edges of the laciniae; below blackish and rhizinose, concolorous at the circumference and glabrous. Apothecia not seen in American specimens, and no specific description of same is available from foreign sources.

On alders.

732, Cape Breton; 717, Hastings, B. C.; 44, Blackwater River, B. C.; J. Macoun.

A not uncommon American plant, but only recognized in published lists from material determined by Wainio; collected by Dr. Fink in Minnesota.

P. VERRUCULIFERA Nyl. in Flora, 1878.

Reaction K^- , C^+ rose, me. K (C) + rose.

Thallus much as in the last, but the surface at the centre confluent verrucose-granulate or sub-isidiose, the granulations here and there white-tipped. Apothecia not known in American specimens.

On old fences, boards and hemlock bark.

720, Seymour, W. Ont.; 3306, Sable Is., N. S.; 3502, Algonquin Lake, Ont. J. Macoun.

Very near to *P. conspurcata* but distinguishable by the surface and reactions. Reported from Isle Miquelon and collected in Maine by the writer, with probably a wider distribution.

P. FULIGINOSA Nyl. in Flora, 1868.

Reaction K_2^- , C_2^- , me.K (C) + red.

Thallus membranaceous, orbicular, appressed, brownish-olivaceous or darker, furfuraceous, fuliginose or black-isidiose; beneath blackish and sparingly rhizino-se; lobes plane, crenate; apothecia moderate, brownish, the exciple thickened and slightly crenate. Spores $\frac{9-12}{5-6} \mu$.

P. FULIGINOSA f. *LAETEVIRENS* Krbg.

Color of the thallus much lighter than the type, a medium green, the isidia concolorous.

Only the form so far seen.

On alders and fence rails.

721, Hull, Que.; 723, Ottawa, Ont., J. Macoun.

Similar to certain forms of *P. olivacea*, but kept apart by the reaction and isidia. Not previously listed from America, although the species cited from Labrador and Isle Miquelon.

P. PROLIXA (Ach.) Nyl. Syn. p. 396.

Reaction none.

On rocks.

3501, Labrador, Waghorne. 725, Lake Nipigon, Ont. J. Macoun. This is *P. olivacea* var. b. *prolixa* of Tuckerman's Synopsis.

P. PROLIXA f. *PANNIFORMIS* Nyl. Syn. p. 397. See Tuck. l. c.

729, on rocks, Victoria, V. I. J. Macoun.

P. SOREDIATA (Ach.) Nyl. in Flora, 1879.

Reaction none.

On rocks.

728, Galt, Ont.; 3446, Algonquin Park, Ont.; 729, Black Water River, B. C.; 730, Nipigon River, Ont. J. Macoun.

P. olivacea var. c. *sorediate* of Tuckerman's Synopsis.

P. DUBIA (Wulf.) Schaer. Enumer. p. 5.

Lichen dubius, Wulf. in Jacq. collect. IV. p. 275, tab. XIX, fig. 1.

The antique name for *P. Borreri* Ach. No specimen of this species was found in the herbarium, a rather remarkable fact, and one confirming the specific rank of *P. rudecta*.

P. RUDECTA Ach. Synopsis p. 197.

Reaction K_2^+ , me. C+ red, soredia C+ red.

On trunks and old rails.

3631, Peele Point, Ont.; 3654, Montmorency River, Que.; 904, Brighton, Ont., J. Macoun; 605, Edmonton, Ont. J. White.

P. Borreri var. *rudecta* of Tuckerman's Synopsis. This plant deserves specific rank equally with such isidiose forms as *P. crinita*, *P. pilosella*, *P. sulphurata* etc. The writer has yet to examine transitional states between the present and *P. dubia*, if such exist.

P. frondifera Merrill sp. nov.

Reaction K^+ , me. C—

Thallus cartilagineous, orbicular, somewhat expanded, decumbent, testaceous at the circumference but cinereo-glaucous centrally, lobate-laciniate and profoundly divided, but confusedly plicate and sub-imbricate centrally, margins crenulate or broadly crenate at periphery, but centrally more divided and even fimbriate and here together with the surface of the thallus beset more or less with reduced fimbriate lobules; the upper surface opaque, confusedly rugulose, and here and there ruptured forming verrucae, these white-sorediate-punctate; within white; below black and rhizinose at the centre, pale with colorless rhizinae at the circumference. Apothecia short pedicellate, cup-shaped, rather large, the disk light-chestnut and bordered by an incurved, radiately rugose and sometimes fissured exciple, this similarly punctate-sorediate with the thallus. Spores oblong-ellipsoid $\frac{1.0}{6-7} \mu$.

On cedar bark, No. 3627. Peele Point, Ont. J. Macoun.

Very near *P. dubia* and *P. rudecta* but separated by lack of reaction with C, the lobulate upper surface and its smaller spores.

Comparable with *P. reddenda* Stirton in lack of reaction. The curious fact may here be noted that nearly all lichenists at some time examine specimens of *P. dubia* and *P. rudecta* which fail to afford its characteristic reaction with C. Nylander himself had this experience, but offered no explanation. All specimens of the two species in our own herbarium with one exception respond to the reagent, and that is a normal *P. rudecta*. Three specimens of *P. frondifera* from widely separated localities, Ontario, New York and Florida are me. C—, and it seems not to be an accidental negative.

P. ulophylla (Ach.) Merrill.

P. caperata var. *ulophylla* Ach. Lich. Univ. p. 458.

Reaction K^- , C^+ bright rose, me. $K(C)^+$ rose, but evanescent; soredia tinged red by C.

Thallus cartilagineous, broadly expanded, decumbent, orbicular, ochroleucous or greenish-ochroleucous, lobate-laciniate at the circumference, but the laciniae coalescing centrally, the margins cut-crenate at the periphery, but sinuous, elevated and invested with conspicuous sub-globose or limbate, granulate or sometimes farinose soredia at the centre, these here and there running together and forming a crust; above opaque, or shining at the circumference, confusedly rugulose, the cortex sometimes here and there rimose or punctate-ruptured producing white soredia; within white; below black and opaque at the centre, shining and brownish at the periphery, with few and scattered rhizinae. Apothecia short-pedicellate, moderate, the disk chestnut, bordered by an incurved, slightly crenate exteriorly sorediate exciple. Spores ellipsoid, $\frac{1.6-5-1.7}{7-9} \mu$.

On trunks, No. 734, Manitoba House, Man. J. Macoun.

This plant has been variously called *P. caperata* var. *ulophylla* Ach. Lich. Univ. p. 458. *P. rudecta* var. *ulophylla* Ach. Synopsis p. 197. and *P. Borreri* var. *ulophylla* Nyl. and Hue. It is probable that this is the plant

mentioned by Tuckerman in the paper, Am. Naturalist Apr. 1868, entitled "Can Lichens be identified by Chemical Tests?" He says "*P. caperata* is reckoned, among the species the medullary layer of which gives no indication of a red tinge with the reagent. I find yet the contrary the case in North American specimens, as well from Arctic American as Texas, etc., almost all these states being marked by elevated powdery margins, as if a var. *ulophylla* (see Ach.) filled in this species an analogous place to the var. *olivetorum* (*P. olivaria*) in *P. perlata*." Tuckerman adds that some specimens of *P. caperata* have a normal reaction however. The form as examined is distinct and deserves specific rank.

P. TILIACEA Ach. Methodus p. 215.

Reaction K^+ , me. $C+$ red.

P. TILIACEA var. *VICINIOR* (Hue) Merrill *P. vicinior* Hue. Li. Ex. Eu. I. p. 156.

K^+ , C^- , $K(C)^-$

Distinguished from the species and var. *subquercifolia* by difference in reaction, and so far as American examples furnish evidence there is nothing else to satisfactorily differentiate with. The writer possesses three examples of *P. tiliacea*, identical in lobation, and thelial characters, in fact exactly similar to the eye and with microscope, but of which one affords the reaction of *P. tiliacea*, another that of *P. vicinior*, and the last that of *P. subquercifolia* K^+_{+} at length red. Both Tuckerman and Willey have touched on the perplexities attending the use of reagents with *P. tiliacea*, but the present disposition satisfactorily meets all requirements of classification for the *P. tiliacea* forms from Northern America. *P. tiliacea* v. *sublaevigata* Nyl. of Tuckerman's Synopsis is made synonymous with *P. subquercifolia* by Hue.

On trunks,

3634, Stittsville, Ont.; 3651, Montmorency Falls, Que.; 597, Brighton, Ont.; 991, Cape Breton; 3509, Algonquin Pk., Ont.; 593 and 592, Ottawa, Ont.; 595, St. Anne's des Monts River, Que.; 594, Quebec, J. Macoun. 596, Canaan Forks, N. B. J. Moser.

No. 102 D. N. A. Li. belongs here.

* GROUP IRREGULARES WAIN.

P. SAXATILIS (L.) Ach. Methodus, p. 204.

Reaction K^+_{+} crimson.

On rocks, trees, old planks, logs, fences and on the earth.

3647 and 3648, Cap à L'Aigle, Que.; 609, Truro, N. S.; 611, Nipigon River, Ont.; 3512, Algonquin Pk., Ont.; 621, Burrard Inlet, B. C.; 614, Lake Nipissing; 622, Red River, Man.; 620, Victoria, V. I.; 629, Comox, V. I.; 625, Stittsville, Ont.; 634, Jupiter River, Anticosti; 616, Lower Arrow Lake, B. C.; 643, Jumping Pound Creek, Ry. Mts.; 640, Victoria, B. C.; 636, Nipigon Lake, Ont.; 638, Cape Breton; 3493, Algonquin Pk., Ont.; 641, Brighton, Ont.; J. Macoun. 647, Clearwater Lake, Labrador, A. P. Low; 625, 627, St. George's Is., Bering Sea; 630, 618, 592, St. Paul's Is., Bering Sea, J. M. Macoun. 623, Vancouver Is. Dawson.

P. SAXATILIS f. *FURFURACEA* (Schaer.) Lich. Helvet. Spiclg. p. 455.

Differs from the species in being more or less isidioid. In high northern latitudes the isidia sometimes cover and completely conceal the thallus with a thick crust, except at the circumference.

On rocks usually, but occurring on trees.

656, Lower Arrow Lake, B. C.; 633, Gaspe, Que.; 659, Cape Breton, J. Macoun. 635, St. Paul's Is., Bering Sea; 624, St. George's Is., Bering Sea, J. M. Macoun. 3492, Blanc Sablon, Labrador; 3823, Bolster Rock, Labrador, A. C. Waghorne.

P. SAXATILIS var. *OMPHALODES* (L.) Fr. Li. Eu. Ref. p. 62. f. *CAESIO-PRUINOSA* Nyl. by Stiz. St. Gall. Nat. Ges. 1876, p. 206. 602. Cape Vancouver, Bering Sea. J. M. Macoun.

No *omphalodes* proper found in the herbarium. The form is like the species in all except being pruinose throughout. It has been the habit of American lichen students to call any dark, reddish, brownish or blackening saxatilis, *omphalodes*, but the genuine form is shining and smooth, not opaque. The reddish or dark color of *omphalodes* or *pseudo-omphalodes* is due to a natural maceration with meteoric or other waters.

P. SAXATILIS *OMPHALODES* f. *PANNIFORMIS* (Ach.) Nyl. by Stiz. l. c.

Thallus densely imbricated, the lobes reduced and scale-like and sometimes caesio-pruinose as in the last.

On rocks

654, Lower Arrow Lake, B.C.; 650, Elbow River, Alta.; 648, Lake Nipigon, Ont. J. Macoun.

Panniform conditions of the species are sometimes seen with normal coloration, and it is probable that most of our dark colored *panniformis* is merely the product of discoloration.

P. SAXATILIS var. *LAEVIS* Nyl. Syn. I. p. 386.

Thallus smooth, rather shining, faintly and delicately reticulated, laciniae narrowed, discrete, below clothed densely with black rhizinae. Apothecia moderate, for the most part plane, chestnut-colored with an entire margin.

On trunks.

639, Cape Breton; 619, Mt. Benson, V. I.; 607, St. Anne's des Monts River, Que.; 608, Jupiter River, Anticosti; J. Macoun; 606, Tobique, N. B. G. U. Hay.

P. SULCATA Tayl. in Mack. Flor. Hibern. (1836) p. 145.

Synonymous with *P. saxatilis* var. *sulcata* of Tuckerman's Synopsis.

Reaction as in *P. saxatilis*.

On old boards, posts and rails, trunks and also rocks.

3304, Sable Is., N. S.; 613, Belleville, Ont.; 632, Comox, V. I.; 649, Jumping Pound Creek, Alta.; 645, Lower Arrow Lake, B.C.; 646, Hastings, B. C.; 3655, Montmorency River, Que.; 3647, Cap à L'Aigle, Que.; J. Macoun. Middleton Is., Alaska. J. M. Macoun.

Differing sufficiently from *P. saxatilis* to be accorded specific rank, in the opinion of Nylander and others, the best argument for separation seems to be that there are no connecting or intermediate states between the two.

SECTION AMPHIGYMNIAE WAIN.

GROUP SUBFLAVESCENTES WAIN.

P. CAPERATA (L.) Ach. Methodus p. 216.

Reaction K_+^- or faint+ me. $K(C)_+$ reddish or orange.

On trunks, old rails and dead wood.

3491, Algonquin Park, Ont.; 733, Guelph, Ont.; 3663, Lincoln Co., Ont.; 4089, Montmorency River, Que.; 745, Nipigon River, Ont.; 742, 735, Belleville, Ont.; 736, Rocky Mts., J. Macoun; 743, Tobique River, N. B., G. U. Hay; 744, Canaan Forks, N. B., J. Moser; Edmonton, Ont., J. White.

P. caperata, or strictly speaking the plant here catalogued has been ascribed to Dillenius (*Lichenoides caperatum rosaceae expansum, sulphureo virens*), by Mudd; to Linnaeus (*Lichen caperatus*) Sp. Plant (1753), p. 1147, almost universally; and to Hoffman (*Lichen caperatus*) Enum. Lich. (1784) p. 94, by Hue Li. Ex. Eua. I, p. 180. Hue seems to base his opinion on the curious discovery made by Wainio and recorded in Rev. Lich. in herb. Linn. asserv. p. 5, that *Lichen caperatus* is the name given by the great botanist in herb. to what is called by Tuckerman *Cetraria juniperina* var. *Pinastri*. This is the more surprising as Linnaeus cites the plant of Dillenius as synonymous with his own, and by no token of the Dillenian plate or text is it to be inferred that they figure or describe *Lichen Pinastri*. This must as surely have been perceived by Linnaeus, as by those later students who have given us commentaries on the Historia Muscorum. That the Dillenian plate really illustrates *P. caperata* is confirmed by Crombie, and notwithstanding the testimony of his herbarium, we believe that Linnaeus framed his diagnosis for *Linchen caperatus* and not *L. pinastri*.

GROUP SUBGLAUDESCENTES WAIN.

P. OLIVARIA (Ach.) Hue Li. Ex. Eur. p. 195.

P. perlata var. *olivaria* Ach. Methodus p. 217.

P. perlata var. *olivetorum* of many authors.

Reaction K_+^+ , me. C_+ red, evanescent.

Thallus cartilagineous, expanded, orbicular, loosely appressed, greenish or cinereo-olivaceous, lobed, the margins of the laciniae undulate, crisped, incurved, and centrally more or less ascendant, marginally white limbate-sorediate in typical states; above opaque or somewhat shining and here and there white-punctate; within white; below blackish and paler at the margins, rhizoides few and scattered, Apothecia moderate to large, in the latter state the margin ruptured but otherwise entire; spores oblong-ellipsoid $\frac{14-18}{7-12} \mu$.

On trunks, rocks and old rails.

590, Cape Breton; 1539, Guelph, Ont.; 513, Tobique, N. B.; 18, Montmorency River, Que.; 4, Algonquin Park, Ont.; 563, McKay's Woods, Ottawa, Ont.; 577, Seymour, W. Ont.; 570, Chelsea, Ont.; 569, Belleville, Ont. J. Macoun. 577, Canaan Forks, N. B., J. Moser; 3629, Kingston Mills, Ont. J. M. Macoun.

P. perlata in part of Tuckerman's Synopsis. Tuckerman's conception of *P. perlata* included a very varied assortment of forms. This assemblage has been differentiated by Nylander, Müller and Hue until it may be safely said to comprise a dozen names.

P. olivaria is very distinct from *P. perlata*, although the difference between it and *P. cetrarioides* or the *P. perlata* of some of the European writers is not very obvious. All the American material in our herbarium identified by others as *P. perlata* belongs here, including No. 8, D. N. A. Lich. The nearest approach to *P. perlata* in the Dominion herb. is no. 567, on old logs, Belleville, Ont. J. Macoun. The plant is sterile, but in reaction and most other particulars is in agreement with that species.

P. OLIVARIA f. *CETRARIOIDES* (Del.) Merrill.

P. cetrarioides (Del.) Nyl. in *Flora* (1869) p. 290.

Reaction K^+ orange, me. $K(C)^+$ reddish.

With difficulty separable from the preceding on any aspect except its behavior with reagents, and no better definition is practicable. This assertion applies to those conditions of the plant commonly met with. In large series of examples forms of considerable diverseness from typical *P. olivaria* may be found, but such authentic foreign material as has been examined leaves us with the conviction that the extremes of variation should not be made to furnish factors for diagnosis. Students are warned not to accept in a plant under examination furnishing a similar reaction, such as evidence of affinity with the present for there are several *Parmelia* forms belonging with other sections affording the same reaction. On trees.

3626, Leamington, Essex Co., Ont.; 572, Truro, N. S. J. Macoun.

P. PROBOSCIDEA Tayl. in Mack.. *Fl. Hibern. II.* (1836) p. 143.

Reaction K^+ , C^- , me. $K(C)^+$ faint red.

Thallus cartilaginous, loosely appressed, orbicular, whitish or pale-glaucouscent, irregularly divided, the lobes convex or plane, subimbricate, at the periphery unequally rounded or sometimes angulate-crenate, the margins of the lobes throughout more or less recurved-ascending, ciliate, above smooth and uniform, esorediate and destitute of isidia; within white, below black, at the circumference brownish, or yellowish or sometimes whitish, and glabrous, centrally more or less rhizino-se. Apothecia large, cupshaped, sessile or at length sub-pedicellate, imperforate, disk chestnut or lighter, with an entire or subcrenulate margin, the exterior of the exciple faintly reticulate-rugose. Spores ellipsoid $\frac{14-22}{9-12} \mu$. On trees.

584, British Columbia. J. Macoun.

P. CRINITA Ach. forma *PILOSELLA* (Hue) Merrill.

P. pilosella Hue Causerie sur les Parm. p. 22.

Reaction K^+ orange, C^- $K(C)^-$

Thallus commonly membranous but sometimes thickened, greenish or ashy-glaucous, irregularly divided, often profoundly lobate, the laciniae convex at the centre, more or less plane at the circumference, centrally coalescent, at the periphery entire and rounded, or lacinulate, the margins crenate or lacerate-crenulate and ciliate; above opaque, more or less rugulose, invested centrally with isidia interspersed with short black cilia, the tips of the isidioid excrescences sorediate or not; within white, below black, opaque or at the margins narrowly testaceous and shining, interruptedly short-rhizino-se. Apothecia rather large, pedicellate, cup-shaped, without perforation, chestnut or lighter, the margin faintly crenulate. Spores ellipsoid $\frac{2.2-5.0}{1.5-1.7} \mu$. On trunks.

536, Central Ontario Junction, Ont.; 3633, Southampton, Ont.; 588, Brighton, Ont.; 3628, Bruce Peninula, Ont. J. Macoun.

P. crinita of Tuckerman's Synopsis appears to include a number of forms by others considered as distinct. There is scarcely anything to distinguish the present from *P. crinita* except the black fibrils of the upper surface, the color of the thallus, and habit of growth. What Tuckerman has termed the southern *P. crinita* seems to be the plant of Acharius.

P. CRINITA forma **varians** Merrill f. nov.

Reaction K^+ orange, C^- , me. $K(C)^+$ intense red.

Scarcely differing from the species except in color and reaction, and without the superficial garniture of cilia as in f. *pilosella*.

3828, Carleton Place, Ont. J. Macoun.

The specimen marked *P. crinita* issued with Dr. Fink's Iowa Lichens belongs here. Rockland, Maine.

MUSCI ACROCARPI BOREALI-AMERICANI.

(Issued by Dr. J. M. Holzinger.)

Fascicle ten of this series was issued last fall, and contains many interesting forms of which the following are the most noteworthy:

Dicranum Starkei W. & M. *Pterygoneuron subsessile* Jur. *Desmatodon plinthobius* S. & L. *Grimmia maritima* Turn. *Grimmia torquata* Grev. *Amphidium Californicum* Schimp *Physcomitrium immersum* Sull. *Paludella squarrosa* Brid. *Timmia austriaca* Hedw. *Catharinaea Macmillani* Holzr.

In addition to the regular issue there are several packets of additional material of the earlier numbers. The specimens of *Grimmia maritima* are especially interesting, since the various manuals confine its range to the shores of the Atlantic Ocean, while these specimens were collected on the Puget Sound Islands by Mr. A. S. Foster. Dr. Holzinger is to be congratulated upon the series that he is issuing; it is absolutely indispensable to anyone that is studying the North American mosses.

EDWARD B. CHAMBERLAIN.

SULLIVANT MOSS SOCIETY NOTES.

New Members—No. 191. Edward J. Wheeler, Ph.D., 79 Chapel Street, Albany, New York. No. 192. W. E. Bristol, Syrian Protestant College, Beirut, Syria.

OFFERINGS.

(To Society Members only. For postage.)

Miss C. C. Haynes, Highlands, New Jersey. *Jungermannia atrovirens* Schliech. Collected in Washington by Dr. Frye. *Ptilidium Californicum* (Aust.) Underw. Collected in Washington by Mr. A. S. Foster.

Mr. Chester C. Kingman, 1 Harnden Street, Reading Mass. *Cephalozia divaricata* Dumort. *Chiloscyphus pallescens* Dumort. *Odontoschisma denudata* Lindb. All collected in eastern part of Massachusetts.

Mr. W. W. Calkins, Berwyn, Cook Co., Illinois. *Sphagnum compactum* DC. in fruit. Also other species offered.

Mr. Edward B. Chamberlain, 38 West 59th Street, New York City. *Hylocomium loreum* B. & S., *Hypnum uncinatum* Hedw. and *Porotrichum alopecurum* Mitt. all c.fr. and collected in Ireland by Rev. C. H. Waddell.

Mr. Charles C. Plitt, 3933 Lowndes Avenue, Baltimore, Md. *Anomodon rostratus* Schimp. Collected in Maryland.

Miss Alice L. Crockett, Camben, Maine. *Placodium aurantiacum* (Leightf.) N. & H. Collected in Camden.

Dr. J. F. Brenckle, Kulm, North Dakota. *Lecanora cinerea* (L.) Sommerf.

Botany

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NOVEMBER 1908



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICS AND LICHENS

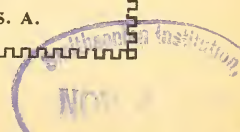
EDITOR
ANNIE MORRILL SMITH
ASSOCIATE
ABEL JOEL GROUT, Ph.D.

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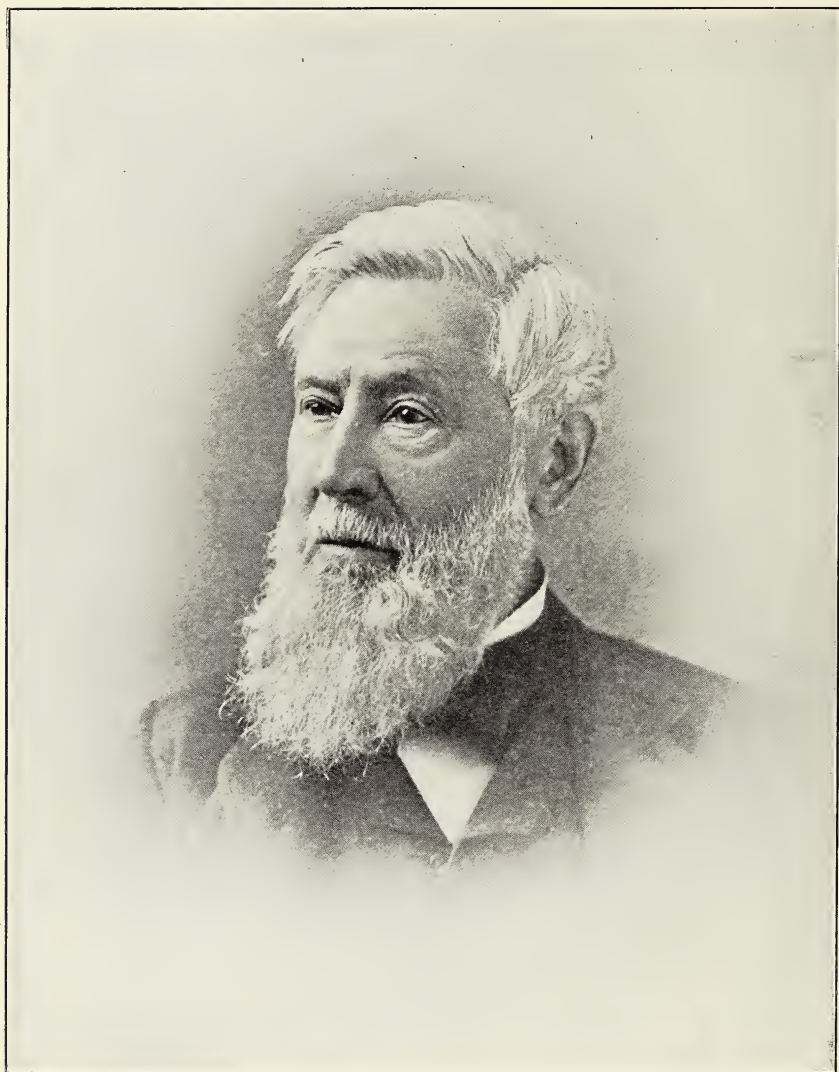
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Andrew

THE BRYOLOGIST.

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No. 6

SOME RELATIONS BETWEEN THE HABITATS OF MOSSES AND THEIR STRUCTURE.

A. J. GROUT.

Fifteen years of study of North American mosses both in the field and herbarium have convinced the writer that many peculiarities of moss structure are a direct result of peculiarities of habitat. It is, of course, extremely difficult to determine whether in any given case a peculiarity in habitat correlated with a peculiarity of structure has a causal relation or is merely a coincidence. Besides it is difficult to find such relationships that are not more or less obscured by exceptions to the general run of facts. The present article is put forth as tentative and suggestive, yet it seems to the author that it certainly contains much of truth, possibly interwoven with more or less misinterpretation.

There are numerous cases where mosses of widely different relationships but of a common habitat, possess strikingly similar characteristics. These similarities must often be due to similar conditions of life. The fact that this has not always been recognized has led to many classifications not at all natural, as for instance the *Cleistocarpi*.

FIRST let us consider the sporophyte. Here the most striking fact to me is that mosses growing largely or wholly on tree trunks have erect capsules. Here we have many species of *Orthotrichaceae*, *Leucodontaceae*, *Fabroniaceae*, *Neckeraceae*, *Leskeaceae* and *Hypnaceae*. An examination of some cases of erect capsules in the *Hypnaceae* illustrates this relation most strikingly. Species classed with *Homalothecium* (*Euhomalothecium* of Cardot) are not separable from *Camptothecium* except by sporophyte characters. In *Brachythecium* the erect-capsuled species, *B. acuminatum* (Hedw.) Kindb., *B. cyrtophyllum* Kindb. etc., are largely tree-growing. I believe it is not the substratum but the position of growth that causes this modification of the capsule so that we find a similar modification in species that grow largely on faces of cliffs or in fissures of cliffs, e. g. *Brachythecium collinum* and its allies. *Pylaisia* is certainly closely related to many species of *Hypnum* having curved capsules, and *Amblystegium adnatum*, largely a tree-growing species, has nearly erect capsules. Many more illustrations could be given but the above will suffice.

Let us consider in what way this growing on a more or less vertical substratum could affect the structure of the capsule. It has undoubtedly been brought about through the medium of spore dispersal. We shall find that very few mosses with erect capsules have complete double peristomes, even if most closely related to others having typically developed double peristomes with segments and cilia, e. g. *Pylaisia*, *Brachythecium acuminatum* and *Homalothecium*. The *Orthotrichaceae* as a rule have only a trace of the inner peristome.

The complete double peristome is a device to prevent the too rapid escape of the spores in mosses with pendent or strongly cernuous capsules, but mosses growing on trees or cliffs can shed the spores much more freely and without waste as the much greater distance above the ground insures freer and more certain access to air currents. Hence imperfect peristomes would be no bar to reproduction, and natural selection would not keep the peristome up to its full perfection. In vertical erect capsules many spores must fail to escape at the most advantageous time or even at all until moisture or old age have rendered them valueless for reproduction. Hence a curved and cernuous or a drooping capsule with the mouth well guarded by a complete peristome would insure the greatest percentage of reproduction in mosses with a vertical seta, but if the substratum be vertical the erect capsule is horizontal or even pendent, as in *Neckera*, and the spores find easy and ready exit.

I am not unaware of exceptions to this line of reasoning, *Hypnum reptile* with a tree habitat and curved capsules, or many species of *Entodon* with horizontal habitat and erect capsules with imperfect peristomes, but there must of necessity be some cases of progressing adaptation and of the survival of a character after a change of habitat has rendered it more or less unsuited to new conditions.

There are undoubtedly many mosses of a more primitive type of peristome in which the erect sporophyte is the primitive condition and these as a class may grow on almost any substratum, e. g. *Georgia*, *Catharinea*, many of the *Tortulaceae*, *Dicranaceae* and perhaps the *Grimmiaceae*. A second apparently similar case of habitat modification is found in the so-called *Cleistocarpi* and many gymnostomous species. These as a rule grow on moist soil, either bare from fresh disturbance or scantily covered with other vegetation. They are usually annual and develop their spores in the spring while the soil is moist, disappearing in many cases during the drier part of the season, though under favorable conditions it seems probable that the protonema may persist for more than one season. The whole subject of the duration of these forms is imperfectly known and more observation is needed. The leaves of these mosses are usually thin and soft although *Astomum* and *Weisia* still retain the leaf-structure of the *Tortulaceae* and are probably not annuals. Some of these mosses may possibly be primitive types but most are degenerate members of families of a high degree of development. Such are *Sphaerangium*, *Phascum*, *Pleuridium*, *Acaulon* and *Bruchia* of the *Cleistocarpi* and *Astomum*, *Physcomitrium*, *Aphanoregma* and *Pottia* species, of the gymnostomous forms. Just how or to what extent the habitat of these degenerate forms has induced the common character is not clear but I believe there is a causal relation.

SECOND. Modifications of the gametophyte. Mosses whose habitat is strongly xerophytic for any considerable portion of the time have small cells and very thick cell walls, e. g. *Grimmia*, *Orthotrichum*, many of the *Tortulaceae* and *Leskeaceae*. This condition obviously retards the escape of water. Many of the larger mosses like some species of *Polytrichum* growing in places where seed plants have abundant moisture are at times thoroughly

dried out by reason of their limited absorption area or lack of vascular system or both. It seems probable that the large papillae found on the surface of the cells of many species may be but an added protection against desiccation, e. g. *Orthotrichum*, *Andreaea*, *Thuidium*, *Anomodon* and *Thelia*. The fact that such species as *Anomodon rostratus* and *Thuidium delicatulum* grow in moist situations does not outweigh the fact that these genera as a whole are xerophytic. The papillae formed by the projecting angles of the leaf-cells as in *Bryhnia* Kaurin belong in a wholly different category. We have a few cases of xerophyte species with papillose leaf-cells in genera which do not as a rule have papillae, e. g. *Dicranum spurium* and *D. condensatum*.

While considering this topic it is well to call to mind the fact that many mosses that are drenched with moisture much of the time are at others exposed to drying winds of high velocity and great absorbing power. Plants growing on exposed rocks in mountains furnish a good illustration of this. *Andreaea petrophila* grows freely all over Mt. Mansfield, Vermont, at an altitude of 4000 feet and over, but fruits freely in sheltered spots only. The evidences of the importance of water supply and retention in the mosses are so abundant and conclusive that further enumeration is not needed here. It is entirely probable that the failure of any terrestrial plants below the vascular cryptogams to attain commanding size is due to the lack of ability to supply and retain sufficient moisture for a greater development.

All careful students of our mosses have noted the large number of quadrate, thick-walled alar cells found in pleurocarpous mosses growing on the bark of trees and similar xerophytic habitats even in genera or families in which such cells are not usually numerous, e. g. *Pylaisia*, *Eurhynchium myosuroides* Schimp., *Isoetecium*, *Rhytidium rugosum* (L.) Kindb. Also note that *Pylaisia Schimperii* (Hedw.) Card. growing in dry exposed situations such as old apple trees has a much larger number of these cells than *P. intricata* (Hedw.) Cardot (*P. velutina* of authors) which grows in moist woods.

On the other hand the alar cells of aquatic or subaquatic pleurocarpous species tend to become enlarged and inflated, e. g. *Drepanocladus* (Harpidium), *Scleropodium obtusifolium*, *Campylium stellatum*, *Brachythecium rivulare*, etc. In these examples it will be noted that the other leaf-cells are mostly exceedingly long and narrow, making the contrast much more striking. The meaning of this modification is very obscure. The almost universal differentiation of alar and basal cells in mosses is possibly due to the fact that their part in photosynthesis is very small and they are the ones most free to respond to other than light relations.

It may possibly be that these thin walled and inflated alar cells of aquatic mosses are structures facilitating osmosis between the contents of the cells and the water outside. It is also possible that scarious leaf bases like those of *Polytrichum* may be water absorbing organs. It is pretty generally admitted that the large thin-walled cells of the leaves of *Sphagnum* serve to absorb and retain water for by means of these cells the plant is almost sponge-like in its power to absorb and retain moisture.

This entire subject is one of the greatest importance to the systematic bryologist and the preceding suggestions only touch upon its fringe. Had its importance been recognized by earlier writers not only would the *Cleistoparpi* never have been treated as a separate group, but *Grimmia* and *Orthotrichum* would never have been put in the same family or *Homalothecium*, *Pylaisia*, *Orthothecium* and *Entodon* been closely associated.

Sometime later I hope to be able to add to the above suggestions and to give an extensive list of species confirming these suggestions, together with such exceptions as I can find.

October, 1908.

Brooklyn, New York.

ASA GRAY.

November 18, 1810—January 30, 1885.

The portrait herewith presented marks the recent publication of the seventh edition of the long familiar "Gray's New Manual of Botany." This volume is illustrated, some groups more fully than others, and rearranged to follow in large part that of Engler and Prantl, but it is still in all essentials the beloved book of our youthful days. It is edited by Benjamin Lincoln Robinson, Asa Gray Professor of Systematic Botany at Harvard University, and Merritt Lyndon Fernald, Assistant Professor in the same University, and published by the American Book Co.

We had hoped to have a biographical sketch to offer at this time but our space is full and we can only refer our readers to the interesting account given by Walter Deane of the life and death of this "venerable Priest" of Botany, in the Bulletin of the Torrey Botanical Club, Vol. XV., No. 3, March, 1888, from which number our plate is reproduced.

A PRELIMINARY LIST OF HEPATICS FOUND IN THE VICINITY OF BALTIMORE.

CHARLES C. PLITT.

Ricciaceae.

1. *Riccia fluitans* L. (terrestrial form).

In early spring, after the snows and ice have disappeared, and the streams are beginning to subside, this pretty little hepatic will be found appearing in great numbers upon areas of the alluvial soil along the river, sometimes, too, extending into the cultivated fields, some distance from its banks.

Marchantiaceae.

2. *Reboulia hemisphaerica* (L.) Raddi.

This is a fairly common hepatic in our limestone regions. I had become so accustomed to seeing it only in such regions, that I was very much surprised to find it once in a shady spot along a roadside in our Coastal Plain.

3. *Conocephalum conicum* (L.) Dumort.

This is possibly our most conspicuous as well as common hepatic. The large patches formed by its wide ribbon-like thallus, covering moist shady banks, where it grows, are sure to attract attention. Notwithstanding that it is so very common, I have never found it in fruit. I have found it only in the Piedmont region.

4. *Lunularia cruciata* (L.) Dumort.

This neat little hepatic is almost sure to be found in any old greenhouse, growing on the soil, generally among the ferns.

5. *Marchantia polymorpha* L.

Another very common hepatic, but rather erratic in its behavior, found sometimes for years in a certain locality, only to suddenly disappear. Almost sure to be found on the hillside of any newly-cut road, especially if such a road goes through moist wooded regions. It, however, does not seem to be over particular in its choice of habitat. I have found it growing on old ash heaps, on the pavements of our city streets, and even in the bed of a shallow stream.

Metzgeriaceae.

6. *Riccardia latifrons* Lindb.

Rather rare, at any rate I have found it but once on a wet decaying log in a deep ravine in the Piedmont region.

7. *Metzgeria conjugata* Lindb.

Not at all uncommon on shaded rocks in deep woods. Found thus far only in the Piedmont region.

8. *Pallavicinia Lyellii* (Hook.) S. F. Gray.

Very common, growing over mosses in swampy woods in our Coastal Plain.

9. *Pellia epiphylla* (L.) Corda.

Another common hepatic, found growing on the ground in moist places of our Coastal Plain. I have found it also, but less frequently, in springy places among the wet rocks in the Piedmont region.

10. *Blasia pusilla* L.

Another fairly common hepatic, sometimes covering large areas. Found in situations similar to those in which *Marchantia* is frequently found. An interesting companion plant is *Anthoceros laevis*. In fact, wherever I find *Blasia*, I am sure of finding *Anthoceros*.

Jungermanniaceae.

11. *Nardia crenulata* (Smith) Lindb.

On earth among rocks in bed of a brook coming down steep hillside. Rather rare.

12. *Nardia obovata* (Nees) Lindb.

Rare. Found at the base of a large over-hanging rock, on moist earth, in Piedmont region.

13. *Plagiochila asplenoides* (L.) Dumort.

On dripping rocks and around the base of trees in swampy ground

There is a marked difference between the form found on the wet rocks of our Piedmont region, and the form found in the swampy ground of our Coastal Plain. The one being true *asplenioides* and the other, no doubt, the form *spinulosa* Dumort. This marked difference, however, is only noticeable when specimens are fresh and growing.

14. *Lophocolea heterophylla* (Schrad.) Dumort.
On ground over mosses, in low woods on the banks of our Coastal Plain rivers. Common.
15. *Chiloscyphus polyanthos* var. *rivularis* (Schrad.) Nees.
Fairly common in wooded swamps in the Coastal Plain, growing over mosses.
16. *Geocalyx graveolens* (Schrad.) Nees.
In localities similar to those in which *Lophocolea* is found, and equally common.
17. *Cephalozia connivens* (Dicks.) Lindb.
In wet thickets on the ground.
18. *Cephalozia curvifolia* (Dicks.) Dumort.
On decaying logs—watersoaked logs.
19. *Cephalozia serriflora* Lindb.
On decaying fallen tree trunks, frequently with *C. curvifolia* and other hepatics. When thus mixed *C. curvifolia* shows out beautifully in red brown, and *C. serriflora* in green.
20. *Odontoschisma denudatum* (Mart.) Dumort.
On decaying logs, in Coastal Plain woods.
21. *Odontoschisma prostratum* (Swartz) Trevis.
Over mosses in Coastal Plain swamps. Very common. I have mistaken this for *Nardia crenulata*, but have now learned that *Nardia* has marginal cells more pronounced, and is only about half the size of *Odontoschisma*.
22. *Calyptogeia Trichomanis* (L.) Corda.
Very common, on the ground, over mosses and on decaying tree trunks.
23. *Bazzania trilobata* (L.) S. F. Gray.
Another common, but very pretty hepatic. Found, thus far, only in the Coastal Plain where it grows over mosses, where it is found in moist places or on wet rotting logs.
24. *Lepidozia sylvatica* Evans.
Found with *Cephalozia curvifolia*.
25. *Ptilidium pulcherrimum* (Web.) Hampe.
On fallen decaying tree trunks, found on the rocky hillsides of ravines in the Piedmont region. It does not seem to be very common.
26. *Trichocolea tomentella* (Ehrh.) Dumort.
This pretty hepatic is found growing over mosses in swampy places. It is common and is found as frequently in Piedmont region as in the Coastal Plain.
27. *Diplophyllia apiculata* Evans.
On earth among rocks, in bed of brook coming down steep hilly places; nearly always with *Scapania nemorosa*.

28. *Scapania nemorosa* (L.) Dumort.

This is quite common, on soil among rocks in moist places and on the ground. In former places, I find *Diplophyllia apiculata* frequently with it. The two plants are readily separated, for even the beginner will observe that whereas *Scapania nemorosa* is ciliated, *Diplophyllia* is not. I find gemmiferous specimens during latter part of August.

29. *Radula complanata* (L.) Dumort.

Fairly common on rocks in Piedmont region.

30. *Porella pinnata* L.

Very common, found on rocks frequently submerged, in brooks of our Piedmont region. When wet it presents a most beautiful appearance.

31. *Porella platyphylla* (L.) Lindb.

Very common on rocks and on the trunks of trees. Found here most frequently on rocks in the Piedmont region.

32. *Leucolejeunea unciloba* (Lindenb.) Evans.

Found on rocks and on tree trunks especially those of *Ilex opaca*. In the Coastal Plain, I find it on trees, and in the Piedmont region generally on rocks.

33. *Jubula pennsylvanica* (Steph.) Evans.

In moist places on rocks or on the ground. Rather rare.

34. *Frullania Asagrayana* Mont.

Very common, on trees and on rocks. Here it is most frequently found on the bark of *Kalmia latifolia*, especially those old plants found on the slopes of our deep shady ravines.

35. *Frullania Brittoniae* Evans.

Not at all common, found thus far only on rocks in the Piedmont region.

36. *Frullania Eboracensis* Gottsche.

More or less common, found generally on smooth-bark trees, upon which it makes some of the prettiest tracings.

37. *Frullania plana* Sulliv.

Found but once, but then in the greatest profusion on shaded rocks overlooking a river, in Piedmont region.

Anthocerotaceae.

38. *Anthoceros laevis* L.

This is quite common, and is likely to be found in almost any wet springy place in the Piedmont region.

Besides the seventeen species with numbers bold faced in the above list, Ward mentions also the following as found near Washington, D. C., in his Check List:

Riccia lutescens Schwein.

Lophocolea bidentata Dumort.

Metzgeria myriopoda Lindb.

Lepidozia reptans (L.) Dumort.

Blepharostoma trichophyllum (L.)

Lepidozia setacea (Web.) Mitt.*

Dumort.

Ptilidium ciliare (L.) Nees.**

Jamesoniella autumnalis (DC.)

Anthoceros punctatus L.

Steph.

Microlejeunea lucens (Tayl.) Evans.

*(Probably *L. sylvatica* Evans).

** (Probably *P. pulcherrimum* (Web.) Hampe). Notes are on authority of Miss Haynes.

Besides these, many of which will in all probability be found also in this vicinity, I have a specimen of *Asterella tenella* (L.) Beauv. collected by Miss Mary F. Miller at Great Falls. This, too, is likely to be found here.

Examining the list of 38 species, as given, we will note the following: That 15 species or more than one-third, are found only in the Piedmont region; 11 species only in the Coastal Plain; 11 species in either, and 1, *Lunularia cruciata*, only in greenhouses. Of the 11 species found in either Coastal Plain or Piedmont region, 6 are found most frequently in the Piedmont, and 1 most frequently in the Coastal Plain, leaving 4 that are found equally common in either region.

This would seem to show, that of the 38 species, 16 of them may be found in the Coastal Plain; but in the Piedmont region, with its greater diversity of soils and conditions, 25 or more than one-half again as many species are to be found.

Species found only in the Piedmont region:

- | | |
|----------------------------------|------------------------------------|
| 1. <i>Riccia fluitans</i> . | 8. <i>Ptilidium pulcherrimum</i> . |
| 2. <i>Conocephalum conicum</i> . | 9. <i>Diplophyllia apiculata</i> . |
| 3. <i>Riccardia latifrons</i> . | 10. <i>Radula complanata</i> . |
| 4. <i>Metzgeria conjugata</i> . | 11. <i>Porella pinnata</i> . |
| 5. <i>Blasia pusilla</i> , | 12. <i>Jubula pennsylvanica</i> . |
| 6. <i>Nardia crenulata</i> . | 13. <i>Frullania Brittoniae</i> . |
| 7. <i>Nardia obovata</i> . | 14. <i>Frullania plana</i> . |
| 15. <i>Anthoceros laevis</i> . | |

Species found only in the Coastal Plain:

- | | |
|---|--------------------------------------|
| 1. <i>Pallavicinia Lyellii</i> | 6. <i>Cephalozia curvifolia</i> . |
| 2. <i>Lophocolea heterophylla</i> . | 7. <i>Cephalozia serriflora</i> . |
| 3. <i>Chiloscyphus polyanthus rivularis</i> . | 8. <i>Odontoschisma denudatum</i> . |
| 4. <i>Geocalyx graveolens</i> . | 9. <i>Odontoschisma prostratum</i> . |
| 5. <i>Cephalozia connivens</i> . | 10. <i>Bazzania trilobata</i> . |
| | 11. <i>Lepidozia sylvatica</i> . |

Species found in either region, but preferring the Piedmont:

- | | |
|------------------------------------|-----------------------------------|
| 1. <i>Reboulia hemisphaerica</i> . | 4. <i>Porella platyphylla</i> . |
| 2. <i>Marchantia polymorpha</i> | 5. <i>Frullania Asagrayana</i> . |
| 3. <i>Scapania nemorosa</i> . | 6. <i>Frullania Eboracensis</i> . |

Species found in either region, but preferring the Coastal Plain:

1. *Pellia epiphylla*.

Species equally at home in either region:

- | | |
|-------------------------------------|------------------------------------|
| 1. <i>Plagiochila asplenoides</i> . | 3. <i>Trichocolea tomentella</i> . |
| 2. <i>Calyptogeia Trichomanes</i> . | 4. <i>Leucolejeunea unciloba</i> . |

In concluding, allow me to state that my thanks are due Miss Caroline C. Haynes, not only for her determinations and verifications of specimens, but now also for kindly rearranging their names according to Engler and Prantl.

Baltimore, Maryland.

LICHEN NOTES No. 7.

Yukon Lichens.

G. K. MERRILL.

The Lichens enumerated below were collected by Prof. John Macoun during July and August, 1902, in the region around Dawson City, upper Yukon. So far as is known this is the first list of these plants for the locality. In working over the material, there has been found a number of forms new to the Alaskan district and a few heretofore unrecorded as occurring in continental North America. The collection is remarkable for the abundance of its distinctly sub-arctic species, although the district explored is situated sixty-four degrees north of the equator. This latitude might well be expected to furnish numerous exclusively arctic forms, but it will be noted that such of these as are enumerated were for the most part found on "the Dome," a mountain four thousand feet in height situated about fifty miles from Dawson. No information regarding the climatic conditions prevailing in the district is possessed, and comment appended to the names is along other lines. Tuckerman's generic arrangement and sequence of species is adhered to, except in *Parmelia* and *Cladonia*.

Cetraria (Ach.) Tuck.

C. (*Dactylina*) ARCTICA (Hook.) Tuck. With mosses, "the Dome," nos. 2 and 5. In no 2 attaining to 5 cent. in height, and provided with lateral pustular ramuli, while no. 5 is smaller and unbranched. Infertile. Reported from various Alaskan localities in most cases maritime.

C. (*Eucetraria*) ISLANDICA (L.) Ach. On humus mixed with other lichens. Hunker Creek, nos. 8 and 9, fertile. The margins of the laciniae more or less connivent and beset with elongated spinules. Both numbers intermediate with var. *crispa*.

C. (*Eucetraria*) RICHARDSONII Hook. On earth, "the Dome," no. 13, infertile. The identification made positive through comparison with Richardson's specimens, by kindness of Prof. W. G. Farlow. Not previously reported from the Alaskan region.

C. (*Eucetraria*) CUCULLATA (Bell.) Ach. On humus, "the Dome," no. 6 infertile. Hue Lich. Ex. Eur. 1, p. 85 reassociates this species with *Cetraria*. Its affinities are clearly with that section which shall include *C. Islandica*, for not only does the latter furnish forms distinctly similar in lobation, but *C. cucullata* is in high latitudes sometimes found with spinulose margins. This condition is noted in the present number.

C. (*Eucetraria*) NIVALIS (L.) Ach. On humus, Mt. Moosehead near Dawson, no. 7, infertile. Hue also reaffirms this species to *Cetraria*. Excellent reasons for this view may be found in West Greenland Lichens, Lindsay, Trans. Linn. Soc. vol. XXVII, 1869, p. 322.

C. (*Platysma*) FAHLUNENSIS (L.) Schaer. On rocks, Hunker Creek, nos. 35 and 36; Bonanza Creek, no. 11; and "the Dome," no. 12. All fertile but no. 35.

C. (*Platysma*) JUNIPERINA (L.) Ach. var. TERRESTRIS Schaer. On naked earth and among mosses, Bonanza Creek, no. 3, infertile. Not mentioned in the Alaskan list of Miss Cummings.

C. JUNIPERINA var. PINASTRI Ach. On birch bark, Hunker Creek, no. 1, infertile.

Alectoria (Ach.) Nyl.

A. (*Eualectoria*) OCHROLEUCA (Ehrh.) Nyl. On earth, "the Dome," no. 14, infertile. Miss Cummings seems to have discriminated *A. ochroleuca* from its variety *rigida* (Vill.) Fr. Ehrhart's name has priority, and *rigida* is merely a synonym.

A. (*Bryopogon*) DIVERGENS (Ach.) Nyl. On earth, "the Dome," no. 15, infertile.

A. (*Bryopogon*) JUBATA (L.) Ach. var. CHALYBEIFORMIS (L.) Ach. On old logs, Hunker Creek, no. 16; on branches, Bonanza Creek, no. 17, both infertile. Another specimen found on spruces, Dawson, no. 19, is referable to var. *lanestris* Ach.

Parmelia (Ach.) Hue.

P. (*Menegazzia*) PHYSODES (L.) Ach. On dead wood, Hunker Creek, no. 28, infertile.

P. PHYSODES form LABROSA (Ach.) Arn. On dead spruces, Bonanza Creek, no. 29, infertile. Not previously reported from the district.

P. PHYSODES form AUSTERODES (Nyl.) Merrill. *P. austerodes* Nyl. Flora, 1881, p. 537. On mosses, "the Dome," no. 31, quite characteristic. On dead wood, Hunker Creek, no. 30, like form *platyphylla*, both infertile. Black edged as in *P. vittata* (Ach.) Nyl. Both plants resemble the species except for coloration.

P. (*Euparmelia*) STYGIA (L.) Ach. On rocks, "the Dome," no. 45, infertile.

P. (*Euparmelia*) CONSPERSA (Ehrh.) Ach. form STENOPHYLLA (Ach.) Merrill. On rocks, Hunker Creek, no. 26, infertile.

P. (*Euparmelia*) CENTRIFUGA Ach. On rocks, Bonanza Creek, no. 24, fertile, no. 25, infertile; Hunker Creek, no. 21, infertile. Not mentioned in the Cummings list.

P. (*Euparmelia*) DIFFUSA (Web.) Th. Fr. On bark and dead wood, Hunker Creek, no. 22. Recorded by Miss Cummings from several Alaskan localities under the synonym *P. ambigua*.

P. (*Euparmelia*) HYPEROPTA Ach. On dead wood, Hunker Creek, no. 23; on rotten wood, West Dawson, no. 40, both fertile. *P. ambigua albescens* of the Cummings list.

P. (*Euparmelia*) OLIVACEA (L.) Ach. On birch bark, Bonanza Creek, no. 27, infertile. No reaction observed with K or C.

P. (*Euparmelia*) SAXATILIS (L.) Ach. var. OMPHALODES (L.) Fr. form PANNIFORMIS (Ach.) Nyl. On rocks, Hunker Creek, no. 37, infertile. Not previously recognized as an Alaskan form.

P. (*Euparmelia*) SULCATA Tayl. On trees, West Dawson, nos. 32 and 33, infertile; no. 34, on rocks, "the Dome," is panniform and more or less denigrate.

Physcia (Schreb.) Th. Fr.

P. (*Euphyscia*) *PULVERULENTA* (Schreb.) Nyl. var. *MUSCIGENA* (Whlnb.) Nyl. On mosses, West Dawson, no. 39, and Bonanza Creek, no. 38, both infertile.

P. (*Euphyscia*) *OBSCURA* (Ehrh.) Nyl. On rocks, Hunker Creek, no. 43, and West Dawson, no. 44, both infertile.

P. *OBSCURA* var. *ULOTHRIX* (Ach.) Nyl. On mosses, Hunker Creek, no. 42, infertile. The receptacle hirsute beneath, and the whole plant very dark colored.

Umbilicaria Hoffm.

U. (*Gyrophora*) *ARCTICA* Ach. U. *proboscidea arctica* Tucks. Syn. On rocks, "the Dome," no. 48, fertile and characteristic. Not previously reported from the Alaskan region.

U. (*Gyrophora*) *ANTHRACINA* (Wulf.) Schaer. var. *RETICULATA* Schaer. On rocks, "the Dome," no. 47, fertile, the apothecia elevated. Not previously reported from the region.

U. (*Gyrophora*) *HYPERBOREA* Hoffm. On rocks, "the Dome," no. 49, fertile.

U. (*Gyrophora*) *VELLEA* (L.) Nyl. On rocks, "the Dome," no. 50, infertile. Specimen poor and complicate-lobed. Only U. *vellea tylorrhiza* Nyl. previously recorded from the Alaskan district.

Nephroma Ach.

N. (*Eunephroma*) *ARCTICUM* (L.) Fr. On earth, Bonanza Creek, no. 54, fertile.

N. (*Nephromium*) *EXPALLIDUM* Nyl. On earth, Hunker Creek, no. 55, fertile.

N. (*Nephromium*) *HELVETICUM* Ach. On rocks, Hunker Creek, no. 56, fertile. Not previously reported from Alaskan district.

N. (*Nephromium*) *LAEVIGATUM* Ach. On rocks, Hunker Creek, no. 52, infertile.

N. *LAEVIGATUM* var. *PARILE* (Ach.) Nyl. On rocks, Bonanza Creek, no. 53, infertile.

Peltigera Willd.

P. (*Peltidea*) *venosa* (L.) Hoffm. On earth, Hunker Creek, no. 117, fertile.

P. (*Peltidea*) *APHTHOSA* (L.) Hoffm. On earth, West Dawson, no. 118, infertile.

P. (*Eupeltigera*) *SCUTATA* (Dicks.) Leight. On earth, Hunker Creek, no. 122, infertile, spongiöse beneath and distinctly limbate-sorediate. Previously reported from Kotzebue Sound.

P. (*Eupeltigera*) *PULVERULENTA* (Tayl.) Nyl. On earth, Bonanza Creek no. 119, infertile. The cortex granulate.

P. (*Eupeltigera*) *RUFESCENS* (Neck.) Hoffm. On earth, Dawson, no. 121, and Hunker Creek, nos. 120 and 120a, the latter fertile.

P. *RUFESCENS* sub-sp. *SPURIA* (Ach.) Nyl. Syn. p. 325. On earth, Hunker Creek, no. 123, fertile.

Solorina Ach.

S. *CROCEA* (L.) Ach. On earth, "the Dome," no. 127, fertile.

S. *SACCATA* (L.) Ach. On earth, Hunker Creek, no. 126, fertile.

Pannaria (Delise) Tuck.

P. *Psoroma* HYPNORUM (Hoffm.) Koerb. On humus and charred wood, Dawson, no. 129; spores 17-20 x 10-11 μ , ovoid-ellipsoid and colorless. On earth and wood, Hunker Creek, no. 128, spores 14-20 x 8-10 μ .

P. (*Eupannaria*) BRUNNEA (Sw.) Mass. On earth, Bonanza Creek, no. 131; spores 18-23 x 9-12 μ , ovoid-ellipsoid and colorless. On earth, Hunker Creek, no. 130.

Collema Ach.

C. (*Eucollema*) MELAENUM Ach. On earth, Hunker Creek, no. 167, spores 17-23 x 10-12 μ , broad-ellipsoid, muriform and decolorate.

Leptogium (Ach.) Fr., Nyl.

L. (*Mallotium*) SATURNINUM (Dicks.) Nyl. var. TOMENTOSUM Hoffm. On rocks, Bonanza Creek, no. 163, infertile,

Placodium (DC.) Naeg. & Hepp.

P. (*Euplacodium*) ELEGANS (Link) DC. On mosses, Bonanza Creek, no. 79, fertile.

P. (*Callopisma*) CERINUM (Hedw.) Naeg. & Hepp. var. PYRACEA Ach. On willow bark, West Dawson, no. 80, spores 11-13 x 6-7 μ .

P. (*Callopisma*) JUNGERMANNIAE Vahl. On mosses and fragment of *Peltigera*, Hunker Creek, nos. 81 and 171, spores 17-20 x 7-10 μ .

P. (*Callopisma*) SINAPISPERMUM (Auct.) Hepp. On mosses, Hunker Creek, no. 82, spores 20-21 x 10-12 μ .

Lecanora (Ach.) Tuck.

L. (*Eulecanora*) SUBFUSCA (L.) Ach. var. HYPNORUM Schaer. On mosses, Bonanza Creek, nos. 133 and 134, spores 11-15 x 8-10 μ .

L. SUBFUSCA var. COILOCARPA Ach. On bark of trees, Hunker Creek, no. 143.

L. (*Eulecanora*) ATRA (Huds.) Ach. On rocks and trunks of trees. Hunker Creek, nos. 139 and 142, spores of no. 142, 10-17 x 4-9 μ ; those of no. 139 much smaller, 10-12 x 4-5 μ .

L. (*Eulecanora*) VARIA (Ehrh.) Nyl. Tuckerman's a. On various trees, Hunker Creek, no. 139a, spores 10-12 x 5 μ .

L. (*Haematomma*) VENTOSA (L.) Ach. On rocks, "the Dome," no. 139, spores 33 x 2 μ , acicular and pluriseptate.

L. (*Ochrolechia*) PALLESCENS (L.) Schaer. On wood, Bonanza Creek, no. 144, spores 77-83 x 40-48 μ , broad-ellipsoid.

L. (*Ochrolechia*) TARTAREA (L.) Ach. On mosses, Hunker Creek, no. 137, spores 60-63 x 27-37 μ , me CaCl+; on rocks, "the Dome," no. 88, infertile.

Rinodina (Mass.) Tuck.

R. (*Eurinodina*) TURFACEA (Wahl.) Nyl. On mosses, Hunker Creek, no. 135, spores 40-45 x 12-17 μ , variously shaped, even showing a tendency toward muriform conditions.

R. (*Eurinodina*) SOPHODES (Ach.) Nyl. emend. var. CONFRAGOSA (Ach.) Nyl. On birch bark, Hunker Creek, no. 141, spores $27-37 \times 11-15\mu$; on various trees, Moosehead Mt., Dawson, no. 140, spores $27 \times 13\mu$.

R. SOPHODES var. EXIGUA (Ach.) Fr. On willow bark, West Dawson, no. 151, spores $13-20 \times 7-9\mu$. Not mentioned in the Cummings list.

Pertusaria DC.

P. DACTYLINA (Ach.) Nyl. On mosses, "the Dome," no. 138, spores $225-250 \times 85-100\mu$, solitary.

P. GLOMERATA (Ach.) Schaer. On rocks. "the Dome," no. 86, spores $164-180 \times 64-70\mu$, invested with a halo, and in two's.

Urceolaria (Ach.) p.p. Nyl.

U. SCRUPOSA (L.) Nyl. On rocks, "the Dome," no. 84, spores $37 \times 20\mu$, muriform. Seems to be new for the region.

Stereocaulon Schreb.

S. PASCHALE (L.) Fr. In bogs, Bonanza Creek, no. 161.

S. TOMENTOSUM (Fr.) Th. Fr. On rocks, West Dawson, no. 160; on mosses in bog, Bonanza Creek, no. 159; on rocks, Hunker Creek, no. 158.

S. TOMENTOSUM var. ALPINUM Th. Fr. On rocks, "the Dome," no. 162a.

Pilophorus Th. Fr.

P. CEREOLUS (Ach.) in Tuckerman's sense, var. ACICULARIS Ach. & Tuck. On rocks, Bonanza Creek, no. 157. The spores five times longer than thick.

Cladonia Hill.

Sub-genus CLADINA (Nyl.) Wain.

C. RANGIFERINA (L.) Web. On earth, West Dawson, no. 91.

C. RANGIFERINA forma **leucosticta** Merrill f. nov. In a bog, Hunker Creek, nos. 112 and 113. KHO+ Verrucose-maculate and between the verrucae semi-pellucid.

C. SYLVATICA (L.) Rabenh. var. SYLVESTRIS Oed. On earth, Hunker Creek, no. 92.

C. SYLVATICA f. VALIDA Rabenh. In a bog, Hunker Creek, no. 93. Not previously reported from America.

C. ALPESTRIS (L.) Rabenh. m. SPHAGNOIDES (Hepp) Wain. On earth, Bonanza Creek, no. 90.

Sub-genus CENOMYCE (Ach.) Th. Fr.

Section COCCIFERAE Del.

C. COCCIFERA (L.) Willd. var. STEMMATINA Ach. form GRANDIS Krempf. On earth, Hunker Creek, no. 59. Not previously reported from North America.

C. DEFORMIS Hoffm. m. EXTENSA (Hoffm.) Wain. On earth in bogs, West Dawson, no. 57; on earth, Hunker Creek, no. 57a. Although not previously reported under this combination, it is probable that all the recorded Alaskan examples belong here.

Section UNCIALES (Del.) Wain.

C. AMAUROCRAEA (Flk.) Schaer. form CELOTEA Ach. In peat bogs, Bonanza Creek, no. 100; on earth, Bonanza Creek, nos. 60, 61 and 68. Not previously reported under this combination from the Alaskan district. This

is the scyphiferous state of the species and the one most commonly met with in the mountains of the eastern United States.

C. AMAUROCRAEA form OXYCERAS Ach. In a bog, Hunker Creek, no. 67. Previously unreported.

C. AMAUROCRAEA form FURCATIFORMIS (Nyl.) Wain. In a bog, Hunker Creek, no. 110. Not previously reported.

C. UNCIALIS (L.) Web. m. TURGESCENS Del. sensu Wainio. On earth and in a bog, Hunker Creek, nos. 68 and 105; on earth, "the Dome," no. 101. All intermediate with *C. uncialis* v. *adunca* Ach. Typical specimens of *m. turgescens* are found in the following numbers; on earth, Hunker Creek, no. 64; Bonanza Creek, no. 102; and interspersed with mosses, "the Dome," no. 4.

Section CHASMARIAE (Ach.) Flk.

C. FURCATA (Huds.) Schrad. var. RACEMOSA (Hoffm.) Flk. On earth in a bog, Hunker Creek, nos. 114 and 115, and West Dawson, no. 111.

C. FURCATA RACEMOSA form CORYMBOSA (Ach.) Nyl. In a bog, Hunker Creek, no. 95.

C. **multiformis** Merrill in herb. nom. nov. In a bog, Bonanza Creek, no. 96. In part synonymous with *C. furcata* a. *crispata* Flk. of Tucker-man's Synopsis.

C. CRISPATA (Ach.) Flot form INFUNDIBULIFERA (Schaer.) Wain. In a bog, Hunker Creek, no. 97. Intermediate with f. *dilacerata* (Schaer.) Malbr., cortex continuus.

C. CRISPATA INFUNDIBULIFERA sub-form **albo-punctata** Merrill f. nov. In a bog, Hunker Creek, nos. 104 and 108. Corticated in much the same manner as *C. rangiferina* f. *leucostica*, and found in the same locality.

C. CRISPATA f. SCHISTOPODA Wain. In a bog, Hunker Creek, no. 62.

C. CRISPATA var. GRACILESCENS (Rabenh.) Wain. In a bog, Hunker Creek, no. 107. All the *crispata* forms above enumerated hitherto unrecorded for the Alaskan region under the combinations employed.

C. CENOTEAE (Ach.) Schaer, form CROSSOTA (Ach.) Nyl. On earth, Dawson, nos. 94 and 103 in part; in a bog, Hunker Creek, no. 106.

Section PODOSTELIDES (Wallr.) Wain.

C. CARIOSA (Ach.) Spreng. form CRIBOSA (Wallr.) Wain. On earth, Hunker Creek, no. 74, previously unrecorded for the Alaskan region.

C. CARIOSA m. CORTICATA Wain. On earth, West Dawson, no. 75. Only once previously recorded from the Alaskan district.

C. DECORTICATA (Flk.) Spreng. On earth, Hunker Creek, no. 71.

Section THALLOSTELIDES Wain.

C. GRACILIS (L.) Willd. var. DILATATA (Hoffm.) Wain. On earth, Hunker Creek, no. 65, and West Dawson, no. 66.

C. GRACILIS var. CHORDALIS (Flk.) Schaer. On earth, Bonanza Creek, no. 69.

C. CORNUTA (L.) Schaer. On earth, Hunker Creek, nos. 70 and 71.

C. PYXIDATA (L.) Fr var. NEGLECTA (Flk.) Mass. On earth, Bonanza Creek, no. 73, and no. 72 from Hunker Creek is an intermediate form between the above and var. CHLOROPHAEA Flk.

C. DEGENERANS (Flk.) Spreng. form CLADOMORPHA (Ach.) Wain. On earth and in a bog, Hunker Creek, nos. 98 and 99. Not previously recorded under this combination from the Alaskan region.

Section OCHROLEUCAE Fr.

C. CARNEOLA Fr. On earth, Hunker Creek, no. 58.

Baeomyces Pers. DC.

B. (*Icmadophila*) AERUGINOSUS (Scop.) DC. On mosses, West Dawson, no. 89.

Biatora Fr.

B. (*Eubiatora*) CUPREA (Sommerf.) Fr. On mosses, Bonanza Creek, no. 152, spores 13-15 x 4 μ , oblong-ellipsoid and simple.

B. (*Eubiatora*) VERNALIS (L.) Fr. On dead wood, Hunker Creek, no. 149. Spores 12-15 x 5-6 μ , bilocular; on mosses, Dawson, no. 83; Bonanza Creek, no. 154; Hunker Creek, nos. 150 and 177, spores 12-19 x 4-5 μ , oblong-ellipsoid and simple.

B. (*Bilimbia*) SPHEROIDES (Dicks.) Tuckerm. On earth, Hunker Creek, no. 148, spores 14-17 x 3-4 μ , fusiform and quadrilocular.

Buellia (D.N.) Tuck

B. (*Catolechia*) PULCHELLA (Schrad.) Tuck, On rocks, West Dawson, no. 145, spores 12-17 x 7-9 μ , bilocular and brown. New to the Alaskan region.

B. (*Eubuellia*) PAPILLATA (Sommerf.) Tuck. On earth and rocks, Hunker Creek, no. 155, spores 20-25 x 7-11 μ , bilocular and brown.

B. (*Eubuellia*) MYRIOCARPA (DC.) Mudd. On wood, Hunker Creek, no. 175, spores 16-18 x 7-9 μ , bilocular and brown, hypothecium colorless.

Sphaerophorus Pers.

S. GLOBIFERUS (L.) DC. On earth, "the Dome," no. 169. The nitidescent arctic state.

Normandina Nyl.

N. LAETEVIRENS Turn. On mosses, Hunker Creek, no. 125.

The following named plants were secured in Skagway, by the same collector:

CETRARIA (*Platysma*) GLAUCA (L.) Ach. var. STENOPHYLLA Tuck. On old logs, no. 10.

ALECTORIA (*Bryopogon*) JUBATA (L.) Ach. var. IMPLEXA (Ach.) Th. Fr. Scand. On trees, no. 18. KHO+ yellow. This is *implexa vera* and not the commonly found dark colored form of the United States, the reaction for which is KHO+ fuscous. Only four stations for *implexa vera* are known to the writer for North America.

PHYSCIA STELLARIS (L.) Nyl. On birch bark, no. 41.

NEPHROMA (*Nephromium*) TOMENTOSUM (Hoffm.) Koerb. On rocks, no. 51.

NEPHROMA (*Nephromium*) LAEVIGATUM Ach. var. PARILE (Ach.) Nyl. On rocks, no. 124.

Pertusaria sub-velata Merrill sp. nov. On birch trees, no. 87. Much resembling *P. velata* (Turn.) Nyl. the distinguishing differences being afforded in the elevated *drum-shaped* apothecia of which the disk is brown, white-pruinose, sometimes granulate, and the reaction. The spores are solitary measuring 210-230 x 66-90 μ . Reaction, K $\bar{+}$. C $\bar{+}$, K(C) $\bar{+}$, for *P. velata* K $\bar{+}$, C $\bar{+}$ red.

SPHAEROPHORUS GLOBIFERUS (L.) DC. On rocks, no. 168.

PILOPHORUS CEREOLUS var. ACICULARIS Tuck. On rocks, no. 156.

Rockland, Maine.

REPORT ON THE HEPATICAE OF FRANCONIA MOUNTAINS, N. H.

The forty-third field meeting of the Appalachian Mountain Club was held at the Profile House, N. H., July 3-11, 1908. Owing to the burning of the Summit House on Mount Washington, the projected meeting of the New England Federation of Natural History Societies at that place was abandoned, and the Appalachian Club courteously offered the privileges of guests to any of the Federation who desired to attend.

This invitation was accepted by a committee of four from the Sullivant Moss Society, appointed by Miss Haynes, namely: Dr. Evans, chairman; Miss Haynes, Miss Robinson, and Miss Lorenz. The committee, followed in the main the expeditions made by the Club, but collected as copiously as possible en route, besides making some independent explorations.

Mt. Lafayette, Bald Mt., the Flume, Lonesome Lake, and Mt. Agassiz were visited, and rather careful attention was given to the vicinity of Profile and Echo Lakes.

The summit of Mt. Lafayette, 5269 ft. alt., resembles that of Mt. Mansfield rather than that of Mt. Washington. The rock is a coarse granite, in large pieces, instead of the jagged schist of Washington and the Northern Peaks, while the flora is of a somewhat xerophytic character. The most interesting species collected were: *Gymnomitrium concinatum*, *Marsupella ustulata*, *M. Sullivantii*, *Lophozia alpestris*, *Temnoma setiforme*, and *Scapania curta*.

Below the summit is a most enticing tarn, Eagle Lake, whose sphagnum-edged shores produced *Scapania irrigua*, *Mylia anomala*, *Lophozia inflata* and *Calypogeia tenuis*. *Scapania umbrosa* was abundant on wet rocks along the trail above 3000 ft. alt.

The Flume is the well-known ravine on the slope of Mt. Flume, about five miles south of the Profile House. It is about 700 ft. long, with perpendicular walls of coarse granite, about 10 ft. apart in the narrowest part, and perhaps 60 ft. deep. Flume Brook enters by a cascade over the upper end of the ravine. The walls are constantly dripping with moisture, and support a rich moss-flora. Although we did not find any species new to New Hampshire, it well repaid the day's work, as we collected *Lejeunea cavifolia*, *Riccardia pinguis*, *Nardia hyalina*, *Jungermannia pumila*, *Lophozia inflata*, *L. Lyoni*, *Sphenolobus exsectus* and *Scapania curta*.

Lonesome Lake lies on the south-eastern slope of Mt. Cannon, at an elevation of 2750 ft. and commands a magnificent view of the Franconia range. It is nearly surrounded by the choicest kind of heath and sphagnum bog, which yielded *Mylia anomala*, *Cephalozia pleniceps*, *Cephalozia fluitans*, *Calypogeia tenuis*, and *Lepidozia setacea*. *Lophozia longidens* was found on the dry bark of a dead birch on the bridle path.

Bald Mt., 2394 ft., our first climb, produced *Lophozia bicrenata*. On our return we found *Sphenolobus Hellerianus* on some old logs. It grows mixed with other things, particularly *Cephalozia curvifolia*, and prefers a rather dry log, with the bark off, but the wood still firm, while *Scapania apiculata* wants wood bare, but wet.

The old logs of the region were particularly prolific, yielding *Cephalozia serriflora* and *Calypogeia suecica*, both new to New Hampshire. *Lophozia Marchica* also new to New Hampshire, was abundant on the damp sand-flat south of Echo Lake.

Our researches resulted in the detection of seven species new to New Hampshire, namely, *Lophozia Marchica*, *Cephalozia serriflora*, *Cephaloziella myrantha*, *Lepidozia setacea*, *Calypogeia suecica*, *C. tenuis*, and *Metzgeria pubescens*. This last is new to New England, and grew on the dry bark about the base of a yellow birch, intermixed with *M. conjugata*. The total for New Hampshire is now 115, of which 77 were collected on this trip.

A full set is to be deposited in the herbarium of the New York Botanical Garden, Dr. Evans being responsible for all critical determinations. A list of the species collected follows.

In closing, the Committee desires to express its thanks to the Appalachian Club for the cordial reception accorded to its members.

For the Committee,

ANNIE LORENZ.

Marchantiaceae.

CONOCEPHALUM CONICUM (L.) Dum. Common.

MARCHANTIA POLYMORPHA L. Sand-flat, Echo Lake.

PREISSIA QUADRATA (Scop.) Nees. Flume.

Metzgeriaceae.

BLASIA PUSILLA L. Mt. Agassiz.

METZGERIA CONJUGATA Lindb. Flume, Wildwood Path.

“ PUBESCENS (Schrank) Raddi. On old birch, Wildwood Path.

PELLIA EPIPHYLLA (L.) Corda. Common.

RICCARDIA LATIFRONS Lindb. Logs, rather common.

“ MULTIFIDA (L.) S. F. Gray. Flume, Wildwood Path.

“ PALMATA (Hedw.) Carruth. Old logs, Wildwood Path.

“ PINGUIS (L.) S. F. G. Flume.

Jungermanniaceae.

GYMNOMITRIUM CONCINNATUM (Lightf.) Corda. Mt. Lafayette.

MARSUPELLA EMARGINATA (Ehrh.) Dum. Common.

“ SULLIVANTII (De Not.) Evans. Mt. Lafayette.

“ USTULATA (Hübner.) Spruce. Mt. Lafayette.

NARDIA HYALINA (Lyell) Carr. Flume, Profile Brook.

JUNGERMANNIA PUMILA With. Flume.

“ LANCEOLATA L. Wildwood Path.

JAMESONIELLA AUTUMNALIS (DC.) Steph. On logs, etc. Common.

LOPHOZIA ALPESTRIS (Schleich.) Evans. Mt. Lafayette.

“ ATTENUATA (Mart.) Dum. Rather common.

“ BARBATA (Schreb.) Dum. Bald Mt.

“ BICRENATA (Schmid.) Dum. Bald Mt.

“ INCISA (Schrader.) Dum. Old logs, frequent.

“ INFLATA (Huds.) M. A. Howe. Eagle Lake, Mt. Lafayette; Flume.

- LOPHOZIA LONGIDENS (Lindb.) Macoun. Trail to Lonesome Lake.
 " LYONI (Tayl.) Steph. Flume.
 " KUNZEANA (Hüb.) Evans. Mt. Lafayette.
 " MARCHICA (Nees) Steph. Sand-flat, Echo Lake.
 " PORPHYROLEUCA (Nees) Schiffn. Old logs.
 " VENTRICOSA (Dicks.) Dum. Rocks, frequent.
 SPHENOBOLUS EXSECTUS (Schmid.) Steph. Rocks, rather frequent.
 " EXSECTAE FORMIS (Breidl.) Stepp. Echo Lake.
 " HELLERIANUS (Nees) Steph. Old dry logs.
 " MICHAUXII (Web.) Steph. Rather common.
 " MINUTUS (Crantz) Steph. Rocks, not rare.
 PLAGIOCHILA ASPLENIODES (L.) Dum. Common.
 MYLIA ANOMALA (Hook.) S. F. Gray. Mt. Lafayette, Lonesome Lake.
 " TAYLORI (Hook.) S. F. Gray. Mt. Lafayette.
 LOPHOCOLEA HETEROPHYLLA (Schr.) Dum. Rather common.
 CHILOSCYPHUS PALLESCENS (Ehrh.) Dum. Wildwood Path.
 " POLYANTHUS (L.) Corda. Wildwood Path.
 HARPANTHUS SCUTATUS (Web. f. & Mohr) Spruce. Old logs, frequent.
 GEOCALYX GRAVEOLENS (Schr.) Nees. Not rare.
 CALYPOGEIA SUECICA (Arn. & Pers.) C. Müll. Frib. Old logs, Wildwood Path.
 " TENUIS (Aust.) Evans. Eagle Lake, Mt. Lafayette, Lonesome Lake.
 " TRICHOMANIS (L.) Corda. Common.
 BAZZANIA TRICRENATA (Wahl.) Trevis. Flume.
 " TRILOBATA (L.) S. F. Gray. Common.
 LEPIDOZIA REPTANS (L.) Dum. Frequent.
 " SETACEA (Web.) Mitt. Lonesome Lake.
 CEPHALOZIA BICUSPIDATA (L.) Dum. Frequent.
 " CURVIFOLIA (Dicks.) Dum. Common.
 " FLUITANS (Nees) Spruce. Lonesome Lake.
 " LUNULAEFOLIA Dum. Common.
 " PLENICEPS (Aust.) Lindb. Old logs, Lonesome Lake.
 " SERRIFLORA Lindb. Old logs, Wildwood Path.
 CEPHALOZIELLA DIVARICATA (Sm.) Schiffn. Mt. Lafayette.
 " MYRIANTHA (Lindb.) Schiffn. Mt. Lafayette.
 BLEPHAROSTOMA TRICHOPHYLLUM (L.) Dum. Frequent.
 TEMNOMA SETIFORME (Ehrh.) M. A. Howe. Mt. Lafayette.
 PTILIDIUM CILIARE (L.) Nees. Rather frequent.
 " PULCHERRIMUM (Web.) Hampe. Common.
 TRICHOCOLEA TOMENTELLA (Ehrh.) Dum. Not rare.
 DIPLOPHYLLEIA TAXIFOLIA (Wahl.) Trevis. Bases of rocks.
 SCAPANIA APICULATA Spruce. Old wet logs. Flume. Wildwood Path.
 " CURTA (Mart.) Dum. Flume, Mt. Lafayette.
 " IRRIGUA (Nees) Dum. Eagle Lake, Mt. Lafayette.
 " NEMOROSA (L.) Dum. Common.
 " UMBROSA (Schr.) Dum. Rocks, Lafayette trail.
 " UNDULATA (L.) Dum. Common.
 PORELLA PLATYPHYLLA (L.) Lindb. Common.
 LEJEUNEA CAVIFOLIA (Ehrh.) Lindb. Common.
 COLOLEJEUNEA BIDDLECOMIAE (Aust.) Evans. Wildwood Path.
 FRULLANIA ASAGRAYANA Mont. Common.
 " EBORACENSIS Gottsche. Common.
 " OAKESIANA Aust. Common above 3000 ft.
 Hartford, Connecticut.

SULLIVANT MOSS SOCIETY NOTES.

There will be a meeting of our Society in Baltimore, Maryland, in connection with the American Association for the Advancement of Science and its affiliated societies during convocation week, December 23 to January 2. The exact date of our meeting and the location of room, has as yet not been decided. If word is received too late for publication in this number of *THE BRYOLOGIST*, cards will be sent out later giving all necessary details. This is to advise all members of the contemplated meeting and urge each one to contribute something in the way of suggestion as to the plan and scope of meeting, also to be present with us and read a paper or give a talk, or send manuscript for use as seems best, or send material for exhibition. An unusually large number have signified intention to be at the meeting and we shall confidently anticipate a larger number than participated in the Columbia University meeting in 1906. Address all communications to Mrs. Smith, 78 Orange St., Brooklyn, N. Y

NOTICE—ELECTION OF OFFICERS.

Members of The Sullivant Moss Society are requested to send ballots AT ONCE to the Judge of Election, Miss Harriet Wheeler, Chatham, Columbia Co., New York. Polls close November 30th. The present board will serve another year if desired; the members are at liberty to vote for any other candidate should they prefer to do so.

For President—Dr. T. C. Frye, University of Washington, Seattle, Wash.

For Vice-Pres.—Miss C. C. Haynes, N. Y. City, and Highlands, New Jersey.

For Secretary—Mr. N. L. Nelson, St. Louis, Mo.

For Treasurer—Mrs. Smith, 78 Orange St., Brooklyn, N. Y.

Sullivant Moss Society New Members. No. 193. Mr. Francis Jackson Bassett, 20 Ashland Street, Taunton, Mass.

IMPORTANT TO ALL OUR SUBSCRIBERS AND SULLIVANT MOSS SOCIETY MEMBERS.

Before this issue of *THE BRYOLOGIST* reaches you, all who are in arrears for the current year, as well as a few who owe for more than this year will receive a bill. This is to comply with the new ruling of the Post Office to the effect that unless subscriptions are either paid for or notice of intention to do so is sent the publisher within six month such names must be dropped from the regular mailing list and sent, if at all, with stamps affix at regular rates instead of publishers' rates.

It has been our custom to send bills only at irregular intervals, say each second or third year. In order to relieve us of this burden will you not pay your bill now, and as many as can conveniently do so add the amount for 1909 and receipts will be returned in accordance. We have one account paid up to January, 1915, and a number for two and four years in advance. In fact,

quite a number always pay for two years in advance, in order to save themselves the trouble of frequent transmission. All accounts become due on January 1st of each year as those subscribing or becoming Society members late in a given year receive the back numbers for that year. New books have just been opened and any corrections as to address, etc., will be gladly noted.

THE EDITOR.

OFFERINGS.

(To Society Members only. For postage.)

- Miss Harriet Wheeler, Chatham, Columbia Co., New York. *Pogonatum urnigerum* Beauv., *Pohlia elongata* Hedw., both c.fr. Collected in White Mountains.
- Miss Annie Lorenz, 96 Garden Street, Hartford, Conn. *Hypnum pallescens* B. & S. c. fr. Collected near Waterville, New Hampshire.
- Miss Alice C. Kendall, 1230 Amsterdam Avenue, New York City. *Hylocomium squarrosum* B. & S., *Hypnum cordifolium* Hedw., both c.fr. Collected in Holden, Mass.
- Mrs. H. C. Dunham, 53 Maple Street, Auburndale, Mass. *Dicranum Drummondii* C. Muell., *D. fuscescens* Turn., both c.fr. Collected at Rangeley Lakes, Maine.
- Rev. H. Dupret, Seminary of Philosophy, Montreal, Canada. *Physcomitrium turbinatum* Brid., c.fr. Collected near Montreal.
- Miss C. C. Haynes, Highlands, New Jersey. *Pallavicinia Lyellii* (Hook.) S. F. Gray. Collected by Mr. S. Rapp in Florida. *Cephalozia divaricata* (Smith) Dumort. Collected by Miss Haynes in the Adirondack Mountains.
- Mrs. Carolyn W. Harris, "The Grafton," Connecticut Avenue, Washington, D. C. *Physcia aquila* (Ach.) Nyl. var. *detonsa* Tuckerm. Collected at Mt. Meenahga, Ellenville, New York.
- Miss Emily L. Crosswell, 20 St. James Avenue, Boston, Mass. *Cladonia squamosa phyllocoma* Rabenh.; *Cladonia reticulata* (Russ.) Wainia (*C. Boryi* Tuckerm.). Collected at Scarsboro, Maine.
- Mr. Reginald Heber Howe, Jr., Thoreau Museum, Middlesex School, Concord, Mass. *Hydrotheria venosa* Russell. Collected on Mt. Monadnock. N. H.
- Mrs. Josephine D. Lowe, 1827 "Eye" Street, Washington, D. C. *Sticta pulmonaria* (L.) Ach.; *S. crocata* (L.) Ach.; *Umbilicaria pustulata papulosa* Tuckerm.; *Leptogium tremelloides* (L. f.) Fr. All collected in Nova Scotia.

WANTED—By Reginald Heber Howe, Jr., Concord, Mass., a copy of 'Enumeration of the Lichens found in New Bedford, Massachusetts, and 'vicinity, from 1862-1892,' by Henry Willey,

THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY

DEVOTED TO

NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

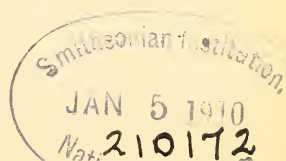
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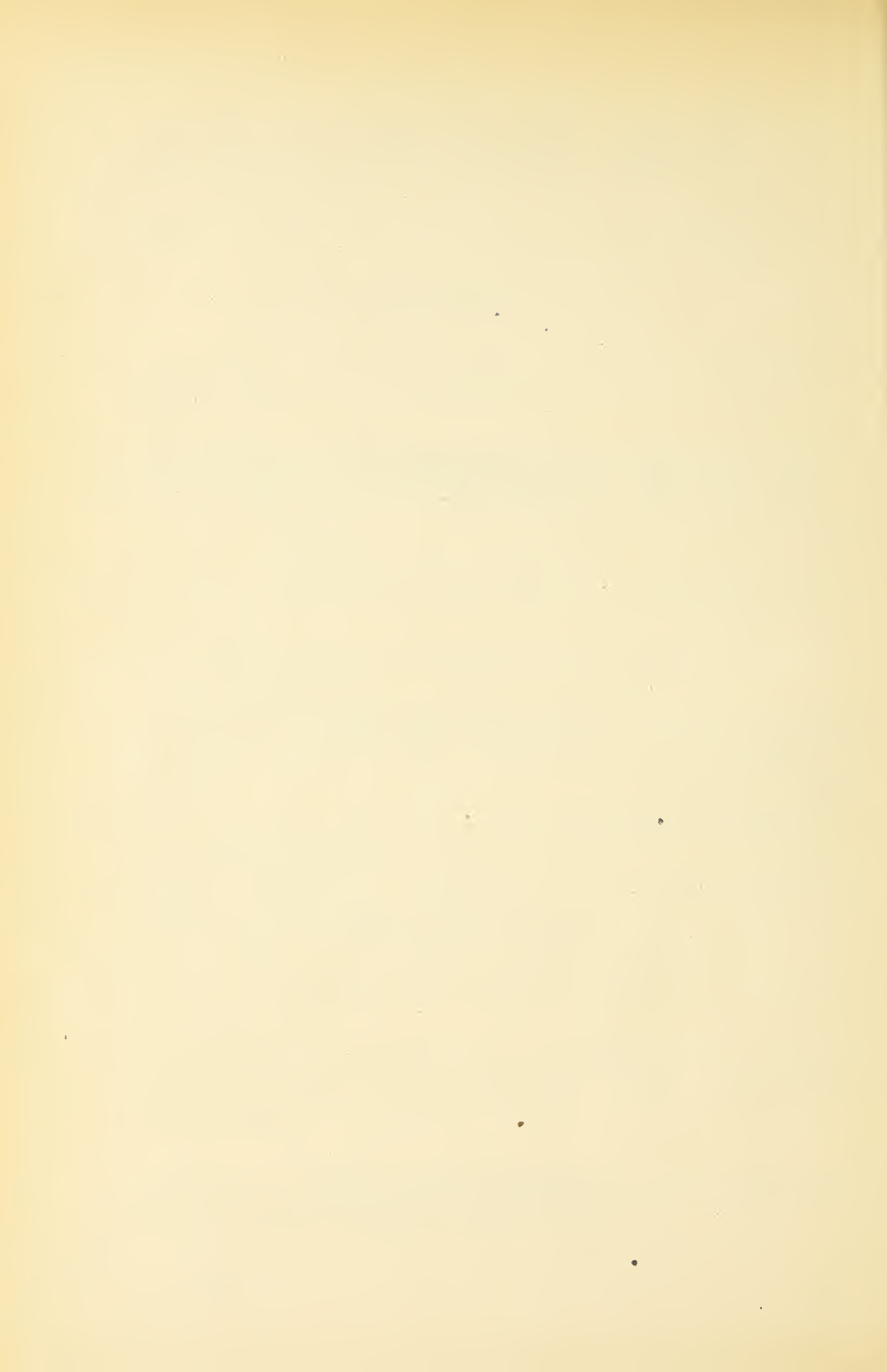
EDITOR

ANNIE MORRILL SMITH

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NORTH AMERICAN MOSSES
HEPATICS AND LICHENS

FOUNDED IN 1898
By
ABEL JOEL GROUT, Ph.D.

EDITOR
ANNIE MORRILL SMITH

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PLATE I. *Cladonia multiformis*.
All reduced one-third.

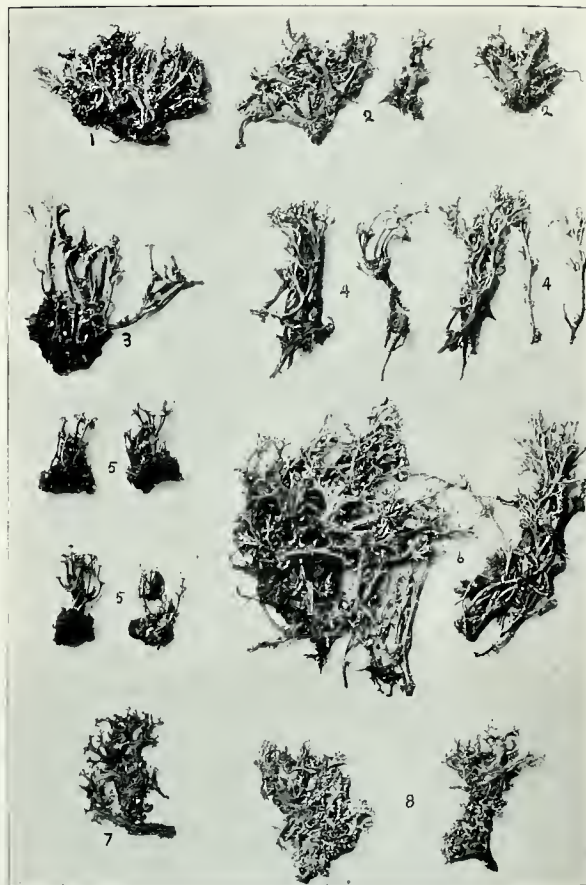


PLATE II. *Cladonia multiformis*.
All reduced one-third.



PLATE I. *Cladonia*
All reduced c

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No. 1

LICHEN NOTES No. 7.

Cladonia multiformis (nom. nov.) Bry. 6: 1908.

G. K. MERRILL.

EXPLANATION OF PLATE I. CLADONIA MULTIFORMIS.

All the above specimens here illustrated were collected in South Thomaston, Maine, within a limited area. An attempt has been made to show in sequence the stages of development between the scyphiform juvenile plant, and maturer conditions ultimately branched. No. 1 illustrates simple podetia without proliferations; Nos. 2, 3, 4 and 5 show both simple and proliferating conditions, and No. 6 cups in two ranks. The remaining numbers, excluding 22, are from specimens showing the beginnings of, and progressively the extent and mode of ramification in branched states. All of these latter show the cups more or less perfectly, and make plain that the species is unquestionably scyphiform. No. 22 illustrates fissured and gaping podetia.

EXPLANATION OF PLATE II. CLADONIA MULTIFORMIS.

No. 1. illustrates a specimen of *C. furcata* var. *Finkii* Wain. received from Dr. Bruce Fink. The cups are not well shown, and the plant is more foliose than any in Pl. I., but there can be no question of its being identical. No. 2 is a short robust state remarkable for being corticated exactly as in *C. gracilis* var. *dilatata* and with its scyphi similar in shape. No. 3 is a well developed exclusively scyphiform condition determined by one authority as *C. furcata* var. *paradoxa* Wain., but the identification afterward amended when called a "scyphiform *C. furcata*." No. 4 coming to the writer labelled as *C. furcata* v. *paradoxa* Wain., is an unaccountable opinion. It is comparable with No. 21 of Pl. I. and No. 6 of the present. No. 5 was determined by an Old World student as *C. furcata* v. *paradoxa* Wain. but afterward amended in the same manner as No. 3; it is comparable with Nos. 4 and 6 of Pl. I. No. 6 is a well developed plant from central Maine attaining to 8 cent. in height, marked as *C. furcata* a. *crispata* by an American authority. No. 7 was determined for the writer as *C. crispata* v. *infundibulifera*, with the remark "cups very large," and No. 8 an exactly similar plant was identified by the same person as *C. furcata* v. *Finkii* with the remark "nearer to this than *racemosa*." All reduced $\frac{1}{3}$.

The plates accompanying this paper provide a fairly complete pictorial view of a well known but little understood American *Cladonia* form. Associated by Tuckerman with *Cladonia furcata* (Huds.) Fr., it is in part described under var. a. *crispata* Flk. in his Synopsis Pt. I, p. 247. American students have apparently found no difficulty in making Tuckerman's description of a. *crispata* fit such examples of *C. multiformis* as were brought to

their notice, and to have been unassailed by doubts regarding the accuracy of their reference, or the status of the form itself. The first to challenge equivalency for the plant with *a. crispata*—or *C. crispata* (Ach.) Fl. as now reckoned, seems to have been Wainio. From material sent to him by Dr. Fink, he indicated the form as a new variety *Finkii* Wain. of *C. furcata*. The evidence that *C. furcata Finkii* Wain. is identical with the plant here defined, is furnished by Dr. Fink's brief description in BRYOLOGIST VII, no. 4, p. 55, examination of specimens of v. *Finkii* communicated to, and determined for the writer by Dr. Fink, and of others identified for Mrs. C. W. Harris. Study of the large series of *C. multiformis* contained in our herbarium prompts a doubt of the validity of this proposed association with *C. furcata*, and brings conviction that the plant however near it may be to other forms, is yet specifically distinct. The comparatively meagre material that the writer has been enabled to transmit to European students has proved puzzling, and no definite place has been fixed by them for the plant, except a tentative concurrence with Wainio's opinion. The most obvious point of resemblance between *C. multiformis* and *C. furcata*, and the one which it is assumed suggested the relationship to Wainio, is only to be noted in such individuals of the first named as are conditioned in that cristate-ramulose manner of which the divisions are more or less fissured and flattened, as in the summits of *C. furcata racemosa corymbosa* Nyl. (sensu Wainio). Now while this resemblance is in a manner confirmatory of such a view, the failure of *C. furcata* in its racemose variations to furnish scyphiform exhibitions even recedently, presents as yet an unbridged gap in phylogentic record. It is true that there are states of *C. multiformis* ultimately resembling certain forms of *C. furcata*, but curiously enough, both must attain a degree of maturity before this is apparant. In no instance so far as our observation extends, is there any similarity between juvenile forms. *C. furcata* is primarily and constantly ascyphiferous, while *C. multiformis* is initially cup-bearing and does not develop ramuli until a scyphus has been formed. Proliferations from this may be, and often are, simple like the basal section of the podetia and terminating in a cup, or at once become branched. Instances have been noted of one proliferation from the first scyphus continuing until five to seven ranks were attained, all cup-bearing, while another becomes branched and cristate. If the species is a hybrid, it may safely be asserted that the fusion is not anterior to the development of the scyphus, and thus that phenomena of the partnership which produces a counterpart of the habit of *C. furcata corymbosa* is in another aspect lessened in importance as a guide to affinity or specific rank. On the evidence afforded by the specimens examined, it seems probable that while the branching summits of the species apparently mark the ultimate of development, this is only true in particular cases, for some individuals never develop ramifications. And again some aspects of *C. multiformis*, as before noted present a dual phase of development, in the curiously inconsistent conditions of a fruticulose combined in one individual with a scyphiferous type; but this while remarkable is not without analogy in Cladonia. The point to be clearly noted is, that of the two modes of proliferation, one scyphiform throughout its development,

and the other dendritic and never provided with cups, the latter must be considered the atypical as it is known to be the inconstant phase of growth. As no observation has yet conclusively established *C. furcata*, its var. *racemosa*, or its modification *corymbosa* to be an ascyphiferous evolution of *C. multiformis* or any other cup-bearing *Cladonia*, there appears no good reason for Wainio's association of the two specifically. Even if *C. multiformis* is assumed to be the phylogenetic precursor of *C. furcata*, and a sequence of metamorphosis is to be found, the term *furcata* is a misnomer in its application to the scyphiferous prototype and a new name is in order. But evidence for such paternity for *C. furcata* is yet lacking. Both species are found in Knox Co., Maine. *C. furcata racemosa* abundantly and in all its forms as recognized by Wainio, *C. multiformis* sparingly. The former grows almost uniformly in colonies, while the latter is usually found solitary or in isolated small clumps. No *C. multiformis* has yet been found growing with *C. furcata racemosa*, nor has the latter been found in any quantity where the former abounds. *C. multiformis* is a shade loving plant, and is scarcely found in any other situation, while *C. furcata racemosa* will obtain a footing under less favorable, and even adverse conditions.

Having specified the points of dissimilarity which serve to distinguish *C. multiformis* from *C. furcata*, a similar severance is undertaken for its alleged relationship to *C. crispata*. The variability of *C. multiformis* has been foreshadowed in the preceding lines. So extreme is this diverseness that beside the erroneous reference of the form to a *crispata* by Tuckerman and others generally, certain of its conditions have been named *C. gracilis*, *C. squamosa*, *C. crispata infundibulifera* and *C. furcata paradoxa* by good American authorities. Although inaccurately identified, any reference of the plant to *C. crispata* may be condoned, for in its various modifications so closely does it simulate some of the *crispata* subdivisions as recognized by Wainio, that only one well acquainted with the diagnostic factors for separation may avoid error. Thus the fissured conditions of *C. multiformis* are not unlike *C. crispata* f. *schistopoda* Wain., the folioliferous m. *divulsa* (Del.) Arn., and the f. *virgata* (Ach.) Wain. finds an imitator in some dark colored scyphiferous states. But all the varying exhibits on examination in an extended series resolve themselves into mere records of development, and the primal characters for the species are obvious throughout. The brief and inadequate description of *Baeomyces turbinatus* v. *crispatus* in the Acharian Methodus might be made to apply to *C. multiformis* equally with *C. crispata*, but in his Synopsis that author gives an amplified diagnosis that clears up the question of what is being described. Further confirmation of this may be derived from a statement of the Abbe Coemans in his "Cladonia Achariana." He says under the head of *C. crispata* that "all specimens of the Acharian herbarium are perfectly typical, and exhibit no approach to any other species." Perhaps the best method of pointing out the differences between *C. multiformis* and *C. crispata* is the parallel column. The form of *C. crispata* described is *infundibulifera* (Schaer.) Wain., for that seems to be the historical type, and is the condition of the species associated with *C. multiformis* under the name of a *crispata* in the Tuckerman herbarium.

CLADONIA MULTIFORMIS.

Primary thallus commonly evanescent, but when observed, consisting of digitate, crenate or sinuous, small or medium sized squamules, growing compacted or diffused.

Podetia irregularly sub-cylindrical at the base, commonly entire but *sometimes fissured and gaping*, slender or stout, simple or *pseudo-branched by obliteration of an early scyphus*, esquamulose or more or less leafy throughout, the cortex continuous or areolate, glaucescent, whitish-glaucous, olivaceous, greenish, fuscous or dark brown, scyphiferous, the cups closed by a *membrane*, or rarely minutely perforated, 2-25 mm. in width, narrowed or abruptly dilated, regular and the disk nearly uniform when small, but often oblique as the plant ages, *old and ex-planate scyphi often becoming sulcate, cribrate and lacerate* between the centre and margin, the margins dentate, or radiately or erectly proliferous, with cylindrical prolongations terminating in a cup, not uncommonly followed by from one to five more ranks, *or the secondary cup obsolete, when one, more or all of the proliferations may become branched*, these erect, divergent or recurved, subcylindrical or compressed, sulcate fissured and gaping, the summits furcate.

Apothecia short-pedicellate on the margins of the cups, or terminal on the extremities of the ramuli in branched states, immarginate, convex or subglobose, *and often perforated at the centre*.

The contents of the hymenium for both species offer no points of difference. Italics mark the distinctive features of *C. multiformis*.

The scyphi of *C. crispata* are *infundibuliform* or rarely closed, those of *C. multiformis* typically *closed* or rarely perforated. This distinction while not infallible is of first importance in identification.

CLADONIA CRISPATA INFUNDIBULIFERA.

Primary thallus persistent or at length evanescent, of commonly medium sized ascendant squamules, these digitate lacinate, but the divisions mostly difform, growing compacted or diffused.

Podetia irregularly sub-cylindrical, commonly uniform, slender or stout, simple or branched, erect, esquamulose or leafy at the base, the cortex continuous or areolate, glaucescent or whitish-glaucous, olivaceous or variegated, scyphiferous, the cups perforated and funnel-shaped, 3-6 mm. in width, commonly abruptly dilated, regular or at length oblique, the margin dentate, or radiately and simply or at length repeatedly proliferous, each proliferation commonly terminating in a cup.

Apothecia seated on the margins of the cups, sub-pedicellate, irregularly dispersed or aggregate.

C. multiformis so far as is ascertainable seems to be an exclusively American form, unless two Scottish plants described by Stirton and alluded to by Wainio Mon. II, p. 454 may be related. The second of these *C. arborea* Stirt. Not. Brit. Clad. (1885) p. 4 according to the description, is not unlike certain states of *C. multiformis*, but Stirton remarks that the cups were all perforated. This seems to imply a relationship to *C. crispata*, and it is under this caption that Wainio records it. A specimen contained in the Tuckerman collection communicated by Sprengnel, marked "ex. herb. Delise" clearly with the present, is labelled *Cenomyce Novae Angliae Delise*, but on testimony of both Nylander and Wainio that name was also applied by Delise to *C. crispata infundibulifera* hence is untenable for the form here discussed.

C. multiformis is found according to data accompanying specimens communicated to the writer on dead wood, humus, thin earth over rocks and among mosses. In Knox Co., Maine, it is found in grassy tufts in old pastures and sparingly with densely growing *C. gracilis elongata*. It has been examined from Lake Nipigon, Ont., Montmorency River, Que., The Gaspé Peninsular, Fraser Falls, Que., and the Klondike region, collected by Prof. J. Macoun. Chilson Lake, N. Y., Mrs. C. W. Harris; Lake Winnepeaukee, N. H., Mrs. L. A. Carter; Sudbury, Mass., Miss C. M. Carr; Swan River Valley, Mont., Mr. T. A. Bonser; Pea Cove, Me., Mr. F. D. Merrill; Waltham, Mass., Mr. W. Gerritson; Guilford, N. H., Mrs. N. Smith, and Flag Island, Minn., Dr. B. Fink. The plant has been personally collected in various localities in Knox County, Maine, and in the White Mountains of New Hampshire.

Rockland, Maine.

ALECTORIA TORTUOSA SP. NOV.

Thallus pendulous, elongated (30-40 cent.), lax, complicate, greenish-yellow, greenish-olivaceous or greenish-fuscescent; the comparatively thickened major branches unevenly terete, terete-compressed or sometimes angulate, the minor ones modified similarly and filiform; rather remotely divided, the branching patent, axils compressed, webbed, and commonly somewhat lacunose, both major and minor branches more or less spirally elevated-white-striate; cortex smooth and sub-opaque. Apothecia not seen.

Anatomically the plant agrees in all its details with that of other *Alectoria* species. The characteristic cottony axis and filamentous cortical layer are identical with the similar elements of *Alectoria sarmentosa* Ach., which is indeed its nearest congener. The color of the thallus may be likened to that of the darker greenish states of *Evernia vulpina*, and in common with that species it communicates a little of its color to white blotters when wetted. The reaction is similar to that of *Alectoria Fremontii* Tuck., *A. jubata proluxa* Ach. and *A. jubata stricta* Ach. being KHO+fuscescent. Comparable with *A. virens* Tayl. in coloration, it differs in all other particulars. The peculiar twisted appearance of the cortical layer is found on splitting one of the branches to be structural, the torsion affecting all the layers. The extent of the twist is observed to equal six complete turns to the inch in one

instance, but some of the branches exhibit none whatever. The white striation is due to a rupturing or near-rupture of the cortex.

Collected by Mr. A. J. Hill in the vicinity of New Westminster, B. C., in July, 1904, and recognition of the plant as a new species was communicated to the discoverer the same year.

G. K. MERRILL.
Rockland, Maine.

A FEW LICHENS AND BRYOPHYTES FROM MOUNT HOOD.

T. C. FRYE.

Between August 23 and 29, 1907, the writer had occasion to make a trip to the Mt. Hood region in Oregon, remaining for a few days in the vicinity of Mt. Hood post office at an altitude of about 2000 feet. From there the mountain was ascended to a height of 9000-10000 feet, following the trail to Cloud Cap Inn, and from there the ridge on the east side of Eleanor Glacier. A few mosses, liverworts and lichens were picked up on the trip, a list of which is here given.

LICHENS.

BIATORA RUBELLA (Ehrh.) Rabenh. Mt. Hood P. O.; on bark of living *Alnus Oregona*.

LECANORA PALLESCENS (L.) Schaer. Mt. Hood P. O.; on trees.

LECANORA PALLESCENS TUMIDULA (Pers.) Schaer. Mt. Hood P. O.; on bark of living *Alnus Oregona*, along rivulet.

PARMELIA SAXATILIS f. LAEVIS Nyl. Mt. Hood P. O.; on bark of living *Alnus Oregona*, along rivulet.

PARMELIA PHYSODES (L.) Ach. Mt. Hood P. O.; on trees along streamlet. This is a very common lichen of the Northwest Coast region.

PELTIGERA CANINA (L.) Hoffm. Mt. Hood P. O.; on dry ground in open woods. A common West Coast form.

PELTIGERA CANINA MEMBRANACEA Ach. Mt. Hood P. O.; on dry soil.

PELTIGERA APHTHOSA (L.) Ach. Mt. Hood P. O.; on rather damp soil along stream. A common form along damp, shady banks in the Northwest.

PELTIGERA VENOSA (L.) Hoffm. Mt. Hood P. O.; on soil in woods. A common form on clay banks.

CLADONIA SUBSQUAMOSA f. GRANULOSA Wain. Mt. Hood P. O.; on dry soil.

EVERNIA VULPINA (L.) Ach. Mt. Hood; on trees; at 2000 feet only in damp hollows, at 8000 feet almost everywhere. This is a common form in high altitudes but usually sterile; here at high altitudes it fruited. Its yellow color makes it one of the most conspicuous lichens of the region.

CETRARIA GLAUCA (L.) Ach. Mt. Hood P. O.; on trees along streamlet. A common West Coast form.

CETRARIA LACUNOSA STENOPHYLLA Tuck. Mt. Hood P. O.; on trees. Often found in higher altitudes along West Coast.

ALECTORIA SARMENTOSA Nyl. Mt. Hood; on trees; altitude 3000-4000 feet. Not a common lichen in low altitudes on the Coast.

ALECTORIA JUBATA PROLIXA Ach. Mt. Hood; on trees; alt. 3000-4000 feet. This is found abundant in the Cascades, but not abundant in lower Coast regions.

LIVERWORTS.

BLASIA PUSILA Michx. near Mt. Hood P. O.; on wet clay bank, along rivulet.

JUNGERMANNIA CORDIFOLIA Hook. On rocks in alpine rivulet, on Mt. Hood; alt. 8000 feet. About the tree limit.

RADULA BOLANDERI Gottsche. Near Mt. Hood P. O.; on logs and on living *Alnus Oregona*; in damp ravine.

RADULA COMPLANATA (L.) Dum. Near Mt. Hood P. O.; on living *Alnus Oregona*, along streamlet.

PLAGIOCHILA ASPLENOIDES (L.) Dum. Mt. Hood P. O.; in water of streamlet.

ANTHOCEROS FUSIFORMIS Aust. Mt. Hood; alt. 8000 feet; on wet soil along Alpine rivulet. This seems to be by far our most common *Anthoceros* in the Northwest.

MOSESSES.

POLYTRICHUM JUNIPERINUM Willd. Near Mt. Hood P. O.; very abundant; on soil in dry open woods. The most abundant of our Polytrichaceae in the Coast region of the Northwest.

POLYTRICHADELPHUS LYALLII Mitt. On soil in wood; on slope of Mt. Hood, alt. 3000-4000 feet. This is not a rare form in high altitudes in the Northwest. It was here growing with *Rhodobryum lucidum*.

Rhodobryum lucidum (E. G. B.) Frye new comb. Mt. Hood; alt. 3000-4000 feet; in fir and hemlock woods, on dry ground, along Cloud Cap Inn trail. This splendid moss, with large, Mnium-like leaves, and very large capsule, was abundant here, and was not seen at any other place.

MNIUM PUNCTATUM Hedw. Mt. Hood P. O.; along stream on wet soil in damp woods. Common. The leaves were larger here than usual, and thus attracted the attention.

HYLOCOMIUM ROBUSTUM (Hook.) Kindb. Mt. Hood; in woods along with *Rhodobryum lucidum*; alt. 3000-4000 feet; on soil in fir and hemlock woods. This form is found usually in mountains in the Northwest at an altitude of 1500-5000 feet. Usually *Camptothecium megaptilum* is associated with it, but that was not found on Mt. Hood.

RHACOMITRIUM LANUGINOSUM Brid. Near Mt. Hood P. O. is an old lava flow, perhaps 150 feet high, a quarter of a mile wide, and 5 miles long, composed of sharp edged fragments of one-half to three feet in diameter. This moss is abundant on these rocks in places, and forms practically the only vegetation at the lower end of the flow. Alt. about 2000 feet.

GRIMMIA DONNIANA Smith. On rocks; Mt. Hood; alt. 9000 feet. This is the last plant noticed in the ascent, other than lichens and *Sphaerella nivalis* "Red Snow."

University of Washington.

FARRANT'S MEDIUM FOR MOUNTING MOSSES.

WILLIAM B. DAVIS.

Dr. R. H. Ward once wrote that for some objects of microscopical interest Farrant's Medium nearly accomplishes the paradox of enabling one to mount specimens without the trouble of mounting them. It is certain, however, that if more workers with the microscope know just how satisfactory this gum and glycerine medium was, that it would be in more demand.

A great many of us are too busy to make permanent glycerine or balsam mounts. Frequently when working on the mosses they are examined in glycerine; and if of sufficient interest, are laid aside without being sealed, but in this condition they quickly spoil. No further labor than mounting in water or glycerine is entailed by using the Farrant's Medium. The advantages are many. In a few hours the gum hardens at the edges and the slide can be cleaned without risk of disturbing the specimen. In fact such slides can be put away for years just as mounted, and then extra fluid can be scraped away with a knife, when desired.

The following suggestions for those not accustomed to this rapid way of working may be of use:

(a) Do not use too much of the medium. With a little experience, an amount sufficient to flood the object nicely to edge of the cover glass will be used. This will do away with the necessity of clearing away the excess; although such excess can be cut away with a knife or washed in a few hours.

(b) Remove air bubbles with a needle and breathe upon the slide and cover glass before making contact. This moistening of the surface will often prevent the entanglement of air bubbles.

(c) The object may be mounted directly or from water, glycerine, or even a weak alcoholic solution.

(d) If the object is thick it might be well to keep in view for a few days, and applying when required a drop of the medium to any air bubbles which may show themselves at the edges.

By adopting this method of permanently mounting moss specimens, in a few years, one may be the possessor of a fairly representative set of microscopic mounts.

The medium can generally be secured from any of the dealers in microscopical materials for about 25 cents a bottle, but for those who desire to put up their own, the following recipe of Prof. A. B. Aubert is given:

Gum arabic	I	ounce
Glycerine	I	ounce
Water	I	ounce
Arsenious oxide.....	1½	grains

Dissolve the oxide in water, then the gum, without heat; when entirely dissolved add the glycerine, take care not to form bubbles; can be filtered through fine flannel.

Philadelphia, Pa.

A SECOND STATION FOR *FISSIDENS CLOSTERI*.

LOUISE HOLMES HANDY.

September 27, 1908, while getting specimens of *Fissidens minutulus* in Tiverton, Rhode Island, near the Massachusetts line, I saw on the opposite bank of the brook a large flat stone covered with a purplish brown protonema and many straw colored specks that proved to be a tiny moss with leaves, seta and capsule. It was impossible to take them from the stone in perfect condition but two small stones with the moss I took home.

Under the microscope it was very beautiful; light green leaves, straw colored seta and capsule with red peristome; the whole plant, as Barnes gives it, less than 1 mm. high. It was found in a brook when the water was low but the banks were very damp and covered with dense shade. We called it *Fissidens Closteri* Aust., and were very glad when Dr. Grout confirmed the determination and said that our locality was the second on record.

Sullivant describes and figures it in *Icones Musc. Suppl.* p. 44, t. 29. If others have found it they have not reported it, but its small size and fruiting in September may account for its being overlooked. The specimens were in all stages, some having calyptra, others with all the spores gone and the leaves turning brown.

Fall River, Mass.

A PLEA AGAINST ABBREVIATIONS.

Some American writers and publishers of exsiccata have in recent years fallen unconsciously into the habit of using geographical abbreviations. If this has not offended, it has certainly caused much annoyance to our foreign confrères, and a plea for reform in this practice comes from Dr. Emilio Levier, the very genial German bryologist resident in Florence, Italy. He writes in part:

"I am often seriously embarrassed to guess at the meaning of the abbreviations, which of course are easy enough for you in America, but which here (Europe) by no means belong to the instruction in elementary branches, and which I therefore am obliged to dig out laboriously from atlas and encyclopaedia. I take at random the label of your No. 70b, *Philonotis fontana*. This reads; "Selkirk Mts., near Armstrong, B. C." Pray what does this B. C. stand for? In my large atlas I find only that the Selkirks belong to *Manitoba*, which can by no possibility be abbreviated to B. C. And of Armstrong, not a trace in Manitoba! These abbreviations and hieroglyphics in labels, as I said before, are a despair to me.

"It seems to me therefore that it would be an extraordinary blessing to all of us not Americans, if you, Dr. Grout and all others, would form the resolution in the future to entirely avoid such unintelligible abbreviations on labels and other publications, and to write out in full all names of states and geographical data."

Dr. Levier then gives another illustration from Dr. Grout's exsiccata, No. 160, *Plagiothecium groutii*, Hempstead, L. I. To his joy our correspondent found by accident that L. I. stands for Long Island; but he insists that of one hundred or even one thousand educated Europeans not one would at sight know what L. I. stands for.

The writer then reverses the case, and assumes to send "*Calymperes Somieri* (Broth. ms.) Bott., Cossyra, Pa., near a vaporarium." Who in America would guess that Pa. was abbreviated from Pautellevia, an isolated islet between Sicily and Tunis! "Certainly," concludes the writer, "you would have good reason to complain of such unreasonable demand upon your knowledge of geography."

I am satisfied that this is a very reasonable and just appeal for clearness. And I am persuaded that every reasonable American—and I am inclined to think all are, though we forget sometimes, as here, to consider "the other man"—will heed the request, and *will act* on it.

JOHN M. HOLZINGER,
Winona, Minnesota.

GEORGIA GENICULATA IN NEW HAMPSHIRE.

This essentially northern species was collected by the writer at Waterville, N. H., during August, 1908. It was fairly abundant at the Cascades, at an altitude of 1800 ft. where it grew among the overhanging ledges, not inside, but around the mouths of the little caves, and bore abundant capsules, both last years, and immature. The best tufts had an approximately western exposure.

Georgia geniculata (Girgens.) Lindb. is distinguished from the common *G. pellucida* (L.) Rabenh. by its bent seta, rough above. At a distance it looks precisely like the ordinary species, but a careful inspection shows the knee-jointed pedicels, which are equally conspicuous on the green setae. At first sight the joint looks as if it had perhaps been accidentally bent, but examination under a lens shows no sign of an artificial bend, the joint also is little swollen.

Mrs. Britton says that this is the first report of *G. geniculata* from New Hampshire. Its distribution, from references at hand, is as follows: Japan, Amur region, Siberia, Alaska, British Columbia, Vancouver, Washington, Idaho, Cape Breton, Nova Scotia, "appears to be common at Trinity Bay, Newfoundland." (Waghorne.)

The only previous report from New England is from Wenham, Mass.,¹ collected, J. H. Sears, in Herb. Kennedy.

When the substratum is mentioned in these references, it is given as "old logs" or "in a swamp," but the writer's specimens were on the ground.

It should be sought in similar situations in other parts of New England. The Cascades are gneiss and coarse granite, with no traces of limestone. Probably it is abundant throughout the White Mountains, but overlooked, *G. pellucida* being too common to collect. It is to be hoped that this note will inspire other collectors to report this interesting species.

Hartford, Connecticut.

1 J. F. Collins, *Rhodora* VIII, July, 1906. p. 131.

ANNUAL REPORTS SULLIVANT MOSS SOCIETY. PRESIDENT'S REPORT.

Another good year may be recorded for the Sullivan Moss Society. With the constantly increasing membership, a wider geographical distribution of its members, and an even better BRYOLOGIST we may expect a still more beneficial year to follow. An examination of the list of members with regard to geographical distribution is rather striking. Of the forty-six states in the Union, twenty-five are represented. Besides these we have members from the District of Columbia, Nova Scotia, Canada, British Columbia, Brazil, New Zealand, Australia, Philippine Islands, Japan, Syria, Finland, Norway, Sweden, Germany, France, England, Ireland. This gives a splendid opportunity for the exchange of mosses from different parts of the world. This is one feature of the club of which the writer believes that the members could take greater advantage than they do at present; allowance must of course be made for the interest of members and the time at their disposal for "offerings." However, to determine mosses, liverworts or lichens, a good herbarium is almost indispensable. THE BRYOLOGIST has printed some excellent articles this year, and we expect these to continue. The writer wonders whether other members also feel the lack of efficient keys to the genera and species of the bryophytes and lichens, especially the latter. It is to be hoped that some members may undertake the publication of good keys to the various genera, for use by members who are not specialists in the work.

T. C. FRYE.

REPORT OF THE SECRETARY.

The Sullivan Moss Society had in January, 1908, a membership roll of 172 names. During the year ten members have withdrawn, and two have died, Mr. T. W. Naylor Beckett, of New Zealand, and Mrs. Amelia F. Eby, of Lancaster, Pa. Twenty-four new members have joined us so that we start out in 1909 with 184 names on our list of members.

The Society Moss Herbarium has been enriched by contributions from various members. Owing to the kindness of Dr. William Trelease, Director of the Missouri Botanical Gardens, a place has been found for our Herbarium in the nearly fireproof quarters where the Garden Herbarium is stored.

The Secretary has tried as far as his time has permitted to get in touch with as many members as possible, many of whom display a great deal of enthusiasm and interest. Mr. Chamberlain has relieved the Secretary of a great deal of the work that former secretaries have done by naming mosses and securing the offerings for THE BRYOLOGIST.

During the past year there have been offered for free distribution to the members of the Sullivan Moss Society fifty species of mosses, exclusive of hepatics and lichens, contributed by twenty different members. These specimens can be secured by any member for the price of the return postage. In order to make this possible for members not resident in the United States, and hence compelled to pay a much greater postage rate, Mr. Chamberlain some two or three years ago undertook to secure specimens of all the moss

offerings for those foreign members who cared to receive them, forwarding the same twice each year. There are now eight of these members who are now regularly receiving the specimens. Any member who is not a resident in the United States can have the specimens forwarded upon notifying Mr. Chamberlain of the wish to receive them. It is hoped that such members may be able to occasionally offer to the Members of the Society specimens of the mosses common in their own countries, but rare or absent in this. Several such offerings have already been made, and members who have material that can be used in this way are urged to communicate with Mr. Chamberlain. It is hoped that more of the species peculiar to North America can be offered in the future.

During 1909 we hope to see as many or more offered to the members, and also hope that a larger number will participate in this distribution.

If a member has twenty specimens (ordinary sized packets) of a given species it can be offered.

N. L. T. NELSON.

St. Louis, Mo.

REPORT OF THE TREASURER.

The following statement for the year beginning December 1, 1907, and ending December 1, 1908, is respectfully submitted:

RECEIPTS.

By cash on hand December 1, 1907	\$ 73 80
By dues from members.....	180.75

\$254.55

DISBURSEMENTS.

To THE BRYOLOGIST	\$169.10
To G. K. Merrill Expressage on Lichen Herb. to Washington, D. C..	1.60
To M. F. Miller Herb. supplies.....	2.75
To Dr. Bailey Expressage on Moss Herb. to St. Louis	7.35
To Secretary for Postage, etc.....	4.00

\$184.80

To cash on hand December 1, 1908	69.75
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\$254.55

THE REPORT OF ELECTION.

The present board of officers is re-elected for another term of service.

Whole number of votes cast.....	10
For President—Dr. T. C. Frye.....	10
For Vice-Pres.—Miss C. C. Haynes	10
For Secretary—Mr. N. L. T. Nelson.....	10
For Treasurer—Mrs. A. M. Smith.....	10

Respectfully submitted,

HARRIET WHEELER.

REPORT OF THE LICHEN DEPARTMENT.

The following report dates from March, 1908:

The Lichen Herbarium of the Society contains at present 594 specimens, representing 48 genera and 266 species and varieties; 137 specimens have been added since the above date, and of these 57 were new to the Herbarium. A large number of lichens have been sent in for determination and it is hoped that a great many more will be sent in during 1909!

Unfortunately, the custodian was prevented by illness from doing much botanical work for several months, and so more than half are still unnamed; however, they are now being studied as rapidly as possible, and members will receive the names of their lichens more promptly during the coming year. The largest contributions were from Mr. Bonser, Miss Croswell, Mr. Wright, Mrs. Lowe, and Dr. Brenckle; there are also many smaller ones from other members. Our thanks are due to Prof. Fink and Mr. Merrill for kind assistance in determining the lichens.

A duplicate list of all the specimens in the Lichen Herbarium, up to date, has been prepared, and will be loaned to any members who will take the trouble to send the postage for it. Members may also have the privilege of borrowing the specimens, if they return them within a reasonable time, and pay the cost of transportation to and from their homes.

If all members of the Society who are interested in lichens will kindly send in lists of the species they have collected in any part of the world—and especially in North America—a general list could then be made out and added to, or corrected from time to time, and a copy of this general list could then be loaned to the members. The carrying out of this would certainly add much to our knowledge of the distribution of species; and the custodian will gladly prepare the general list if the members will do their part.

Respectfully submitted,

MARY F. MILLER.

REPORT OF HEPATIC DEPARTMENT.

It is delightful to make known the generosity of members interested in this Department. There are new contributors, and a majority of the old ones continue to send. A partial result of their work is shown in two published lists and others are in preparation. This year Massachusetts leads with one hundred and twenty-five specimens sent by two students, Miss Helen E. Greenwood and Mr. C. C. Kingman; seventy-five numbers of these specimens are in the Herbarium. The following names bear witness to the truth of my opening statements, adding localities: Dr. J. H. Brenckle, North Dakota; Mr. C. B. Chamberlain, Scandinavia; Rev. H. Dupret, Canada; Dr. Evans, Conn.; A White Mt. set of seventy-seven species, collected July, 1908, Sullivan Moss Society Committee, Dr. Evans, Chairman; Mr. A. S. Foster, Washington and Oregon; Dr. T. C. Frye, Washington; Dr. Grout, North Carolina; Mr. W. E. Haydock, New Jersey; C. C. Haynes, 2d issue American Hepatics; duplicates of English, French and Madagascan species, collected by Messrs. Pearson, Douin and l'Abbé Lacouture; Mr. A. J. Hill.

British Columbia; Mrs. J. D. Lowe, Nova Scotia; Miss A. Lorenz, New Hampshire and Connecticut; Miss M. F. Miller, Maryland and New York; Mr. N. L. T. Nelson, Missouri; Mr. W. E. Nicholson, England; Prof. Shutai O'Kamura, Japan; Gen'l Paris, Madagascan species in exchange; Mr. C. C. Plitt, Maryland; Mr. Severin Rapp, Florida; Dr. C. B. Robinson, Canada; Dr. J. L. Sheldon, West Virginia and Connecticut. Five hundred and forty-one specimens were added to our Herbarium bringing the number to one thousand, six hundred and twenty-five. This consists of eighty-eight genera and four hundred and two species. We are indebted to the following for quantities of duplicates: Miss Miller, Dr. Frye, Messrs. Chamberlain and Rapp, and Rev. Dupret. I cannot close without a warm word of gratitude to Dr. Evans for verifications and determinations.

Respectfully submitted,

Highlands, New Jersey.

CAROLINE COVENTRY HAYNES.

SULLIVANT MOSS SOCIETY NOTES.

The friends of Dr. Grout will be pleased to learned that he has been promoted to be First Assistant in Curtis High School on Staten Island. His address in future will be New Dorp, Richmond Co., New York.

Since the reports and list of Society members were in type two more names have been sent in making our membership on January 1st total 186—Mr. S. L. Schumo, S. W. Corner 22d and Poplar streets, Philadelphia, Pa. and Mr. W. Ralph Jones, 863 Harlem ave., Baltimore, Md.

To the Members of the Sullivant Moss Society:

Dear Friends and Associates: This letter is written merely to clear up some misapprehensions and to give you a chance to express your opinion.

As many of you know, I took a prominent part in the organization of the Chapter and still retain a very active interest in its work though others are officiating, as I hoped would be the case when the Chapter was started. The Sullivant Moss Chapter was founded following the example of the Linnaean Fern Chapter of which I was an early member.

When the Agassiz Association suspended active work some years ago the Fern Chapter changed its name, and the Moss Chapter severed all relations with the A. A. but decided not to change its name thinking it immaterial or unnecessary. The severance of the Sullivant Moss Chapter from the A. A. was by unanimous consent of the executive committee, as it was thought no vote would be necessary to sever a growing stolon from the apparently defunct parent stem. Since the Agassiz Association has been revived or recreated some misapprehension has arisen. While we all wish the new movement success it is possible that a change of name to The Sullivant Moss Society would be advisable for us.

Let us have the benefit of your opinion on this question.

Respectfully submitted,

A. J. GROUT, Curtis High School, New Brighton,

November 30, 1908.

Richmond Co., New York.

Obituary.—Mr. Alvah A. Eaton died at North Easton, Mass. on September 29th (1908), aged 43 years. He was the author of numerous papers on the Pteridophyta and contributed the treatment of *Equisetum* and *Isotes* to the recently published "Gray's New Manual of Botany," seventh edition. For the past six years he had been collector and assistant to Mr. Oakes Ames of the Ames Botanical Laboratory at North Easton, and in this connection made several expeditions to Florida. He was a charter member of the Sullivant Moss Society and always interested in its work.

Mrs. Amelia F. Eby died very unexpectedly on March 4th (1908) at her home in Lancaster, Pa. Her son writes under recent date: "Mother was born March 24, 1831, was a country girl raised on the farm, and was a student of botany from her girlhood days. She was one of the pioneer women school teachers, teaching school in 1848; she had all the works on botany that were obtainable at that time and collected a considerable herbarium. She dropped the work but never lost interest in botanical study. In 1882 she took it up with renewed vigor and continued till the time of her death. Her collection was made all over the country where ever she had the good fortune to go."

Mrs. Eby was an early member of our Sullivant Moss Society and contributed to its herbarium frequently.

OFFERINGS.

(To Society Members only. For postage.)

- Mr. C. C. Plitt, 3933 Lowndes Ave., Baltimore, Md. *Thuidium microphyllum* (Swarts.) Best, c.fr. Collected in Maryland.
- Mr. Edward B. Chamberlain, 38 West 59 street, New York City. *Hypnum aduncum* Hedw. group *typicum* Ren., st. Collected in Vermont by Dr. Grout.
- Mr. E. J. Winslow, 523½ West 4th street, Elmira, New York. *Pogonatum capillare* Brid.; *Bryum roseum* Schreb. Both c.fr. Collected in Vermont.
- Mr. N. L. T. Nelson, 4509 Cote Brillante Ave., St. Louis, Mo. *Thuidium Philiberti* Limpr.; *Grimmia Olneyi* Sulliv. Both c.fr. *Dicranella debilis* L. & J.; *Bryum Muhlenbeckii* B. & S.; *B. pseudotriquetrum* Schwaegr. All collected in Missouri.
- Mrs. B. J. Handy, 139 Rock street, Fall River, Mass. *Brachythecium digastrum* C. M. & Kindb.; *Climacium dendroides* W. & M. Both c.fr. Collected in Fall River.
- Mr. W. W. Calkins, Berwyn, Cook Co., Illinois. *Bryum caespiticium* L.; *Polytrichum commune* L.; *Sphagnum compactum* Brid. All from Cook Co.
- Miss Alice L. Crockett, Camden, Maine. *Ephebe pubescens* Fr. Collected in Camden.
- Mrs. Josephine D. Lowe, 1827 Eye street, N. W. Washington, D. C. *Cladonia multififormis* Merrill; *C. cristatella* Tuckerm.; *C. gracillis* (L.) Wild. var. *elongata* (Jacq.) Flk.; *Ptilidium pulcherrimum* (Ach.) Hampe; *Scapania nemorosa* (L.) Dumort.; *S. Bolanderi* Aust. All collected in Nova Scotia.

Dr. A. LeRoy Andrews, 508 University avenue, Ithaca, New York, contemplates treating the North American Species of Sphagnum and would be glad to determine specimens from any locality for members of the Sullivant Moss Society or subscribers of THE BRYOLOGIST.

Lichens Novae Angliae. An edition of fifty numbers (distributed in decades, postage extra) of New England Lichens is in preparation. The first decade will be ready for distribution in February, 1909. The specimens are to be of exceptional quality, and the data absolutely complete. Single numbers as issued 15c., by decade \$1.10, by set of fifty numbers complete \$5.00. Payment on delivery. Only twenty-five sets will be issued in the first edition. Libraries may have their sets mounted and bound at \$1.00 extra. Address subscriptions to
Thoreau Museum of Natural History. Mr. R. HEBER HOWE, Jr.
Concord, Mass.

An attempt has been made below to indicate as far as the record goes the interest of each member. We are very desirous of having this data complete and to that end ask each person on reading this note to take a post card and write on it the exact facts of past as well as present interest in the three subjects treated of in THE BRYOLOGIST and forward the same to the Editor, AT ONCE.

LIST OF SULLIVANT MOSS SOCIETY MEMBERS.

* Star Indicates Charter Members.

- Adams, Miss Carrie E., R. F. D. 1., Hinsdale, N. H. M.
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Young, Mrs. Rosalind W., Atlin, British Columbia. L.



MARCH 1909



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES

HEPATICS AND LICHENS

FOUNDED IN 1898

By

ABEL JOEL GROUT, Ph.D.

EDITOR

ANNIE MORRILL SMITH

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PLATE III. Beechwood Camp. Rail fence and beech trees by roadside.
Near Oxford, Ohio.

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LICHENO-ECOLOGIC STUDIES FROM BEECHWOOD CAMP.

(Read at the Sullivant Moss Society Meeting, Baltimore, Dec. 30, 1908.)

BRUCE FINK

Beechwood camp lies by the roadside, in a two-hundred acre forest, four and one-half miles from Oxford, Ohio. This forest, much of it practically undisturbed, was obtained from the government by the Hueston family and is now in the hands of the third generation of Huestons, through whose courtesy the department of botany of Miami University is able to use it during a part of each summer as an outing place for botanical study. The Hueston family of the present generation takes great pride in this forest, which is known far and wide, and every assurance is given that it will not be destroyed for many years. A considerable number of the trees have attained practically their full size, and in the portions where beeches abound, offer shade so dense that very little herbaceous vegetation exists under them. Trees have fallen from time to time and have been left undisturbed so that logs and stumps in all stages of decay abound in various portions of the forest. With all conditions regarding light at hand; a few high and nearly bare hills giving xerophytic conditions; an abundance of streams, springs, ledges of rocks, sandy banks; low flood plains, partly alluvial and in part sandy or gravelly, the environment of the camp is quite ideal for ecologic and taxonomic work.

The camp was occupied for the first time last August (1908), and the seed plants, the ferns, the mosses, the lichens and the fungi were all studied more or less from the taxonomic point of view. Nor was the ecologic work initiated confined to the lichens, but was extended to all kinds of plants. However, especial attention was given to certain problems in lichen ecology and to a beginning of tracing the succession of fungi on the logs and stumps. It may be questionable whether a presentation of beginnings is at all worth while, for no data of value have been secured. However, it is the belief of the writer that the methods and aims, simple as they are, are worth stating with a view to stimulating others to similar work. Doubtless much of the more difficult and extended work that the writer has undertaken on lichen ecology will not endure the sifting to which ecology is now being subjected, but it is believed that, whatever more difficult and uncertain lines of research may be undertaken later at the camp, the results that may come from the simple experiments now in progress will be secure and valuable.

We hear and see much stated about the slow growth of lichens, and occasionally one comes upon very opposite statements, such as the growth of podetia and the production of apothecia in certain *Cladonias* in a single season, and the migration of *Umbilicarias* a half a dozen miles along a high rocky ledge in as many years; but thus far there seems to be little if any accurate knowledge regarding such matters. We are also sometimes told

when spores are most abundant in lichens, but this problem also needs careful observation. Not all the problems of interest can be worked out in a single place, and the writer has begun work similar to that at Beechwood camp, on the forest reserve of Berea College, in the foothills of the Cumberland mountains, in Kentucky. In the mountains, certain conditions and plants not found in Ohio can be studied. Neither the matter of periodicity in spore production, nor the ecologic work begun in Kentucky will be considered in this paper; but it may be suggested that studies in spore production is a matter easily handled, and one that would give results of value.

In all the ecologic studies begun at Beechwood camp, the dates of study are recorded and the location of each study carefully noted. However, these data are of no value in presentation and will be omitted. The first study undertaken is as follows: A rectangle eight centimeters square was marked in a patch of *Cladonia fimbriata*, covering a decorticate log. A tack was driven into the log at each corner of the area, and small twine was run around the tacks to enclose the area. The horizontal thallus appeared young, having scattered squamules, covering perhaps one-sixth of the area enclosed, and many of them so small as to be visible only under a hand lens. There were no podetia within the area, though they were plentiful on other portions of the same log. The second study is very similar, being the same species on the same log, with the horizontal thallus better developed and much more thickly disposed upon the substratum, but still no podetia. The purpose in both is to watch rate of development. The conditions as position on the log and resulting amounts of light and moisture received, etc., are all carefully noted.

Studies number three to seven inclusive are all being conducted to ascertain the rate of growth and fruit production in certain lichens. The positions with reference to light and moisture are all noted carefully as well as the present size of the plants and condition as to fruiting. Small twine is stretched and fastened to small nails in such a way as to lie directly over the edges of the thalli at certain points, so that a more certain way may be had for noting growth and its direction, than mere measurements. The plants under observation are *Parmelia caperata*, *Parmelia Borreri*, *Parmelia saxatilis*, and *Graphis scripta* in various conditions of development.

Study number eight is as follows: A levee of limestone fragments of various sizes was laid along a stream about thirty years ago, and is now covered with the crustose lichens which commonly grow upon such rocks near the soil in exposed places. A section of the levee seventy c.m. long, was removed and replaced by similar limestone fragments, taken from the bed of the stream and devoid of lichens. On either side of the portion removed the lichens are growing in profusion on the rocks of the levee, and the rate of invasion and ecesis* in the new portion of the levee and the successions following first establishment may easily be followed. The levee is on low ground and not over a half meter high at any point. Therefore the rate of invasion, ecesis* and succession will doubtless be as rapid as could be expected on such rocks anywhere, except, perhaps in a shaded place, the levee being in an open field.

*Ecesis—from the Greek word meaning "The act of coming to be at home." Referring to the germination and establishment of plant invaders.

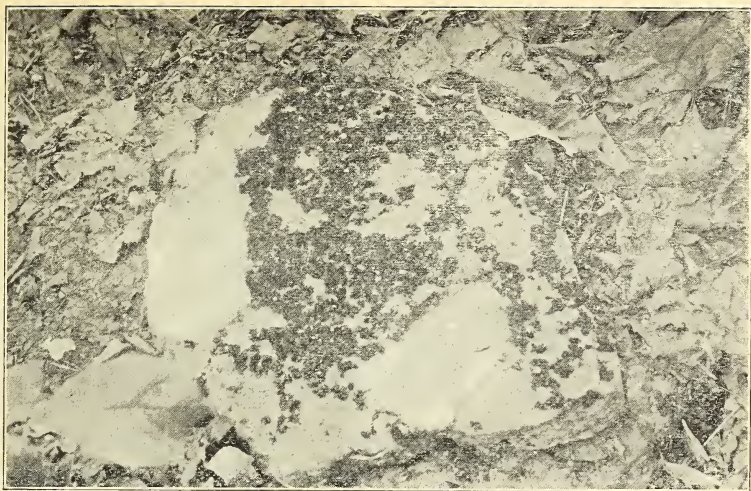


FIG. 1. *Grimmia apocarpa* on rock.

Study number ten is a new sycamore (*Platanus occidentalis*) board replacing an old board in a section of board fence, whose other boards are abundantly covered with *Placodium microphyllum*. The new board is the second from the top of the fence, and the rate of ecesis and something of direction of invasion may be noted. Another study similar to this, not yet numbered, is a new section of picket fence. The old pickets were covered on the north side with *Lecanora varia*, *Physcia stellaria* and some *Parmelias* and other lichens. The old pickets on either side of the new ones are now covered with the same lichens as is also the horizontal framework of the fence to which the new pickets were nailed. This furnishes a most excellent opportunity for observing the rate of invasion and ecesis. In both of these studies, the dates of repairing were obtained from the owner and carefully recorded with other desirable data.

The studies described above have to do with lichens only. Another series was begun, nearly all of which have to do in part or wholly with other plants. A few of these which concern lichens and mosses wholly or mainly will be of interest. The first is as follows: A beech tree, one-half meter in diameter four feet from the base, fell in a storm July sixth, 1907. On the eighth of August, 1908, when the study began, the tree was perfectly sound toward the base, but showed some evidence of having rotted somewhat toward the top before it fell. There was a considerable amount of a *pyrenomyce* on the upper one-fourth of the tree, and in all probability this fungus was growing before the tree fell. The tree was uprooted in such a way that the trunk was left intact so that no fungi could gain entrance at the base, and at the time of the first study, none were growing about the exposed roots. *Parmelia caferata*, *Parmelia Borreri*, and *Trypethelium virens* were growing toward the base of the tree, the foliose ones sparingly, the crustose spe-

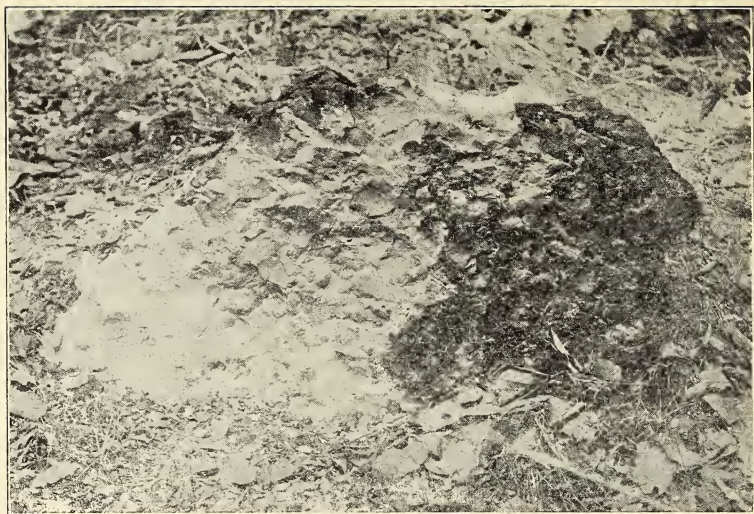


FIG. 2. *Verrucaria nigrescens* on rock.

cies abundantly. The latter was also growing abundantly all the way up the trunk, nearly to the top, and also on some of the larger branches. A moss was also growing rather sparingly three-fourths of the way up the trunk of the tree. It was impossible to make a minute study of the whole trunk of the fallen tree, but an area thirty by one hundred cm. and containing some areas of lichens and mosses which were carefully located, was marked on the bark for future detailed study of succession. Two other areas were marked in the same manner, using small nails and cord, and making similar records of conditions within the areas. The study of rate of decay of this tree and others similarly studied, with observation of successions of plants upon them will surely be interesting and it is hoped may also contribute some data of value. In all such studies, specimens of the plants of each succession will be carefully preserved.

For the fifth study of the second series, a limestone rock was selected one-third meter square and eight cm. thick, lying flat on the ground in the shade and densely covered on the upper surface with *Grimmia apocarpa* Fig. 1. A portion of the surface of the rock was chipped off, one-half to two cm. deep, so that any succession upon the chipped surface must be a primary one. Study number seven is a similar limestone rock, but standing nearly perpendicular, nearly all above ground, and covered on the exposed sides and edges with the lichen, *Verrucaria nigrescens*. Fig. 2. Half of the surface was chipped in the same manner as in study number five, so that the rate and manner of invasion and ecesis may be studied.

Other studies were made of lichens and mosses on ledges of rocks and on large and small boulders in varying conditions of environment, but enough has been recorded to illustrate the methods employed.

Miami University.

Oxford, Ohio.

NOTES ON CEPHALOZIELLA (SPRUCE) SCHIFFNER.

[Read at the Sullivant Moss Society Meeting, Baltimore, 1908.]

ANNIE LORENZ.

In one of his "Bryologische Fragmente," Schiffner characterizes the above as "die äusserst schwierige Gattung *Cephaloziella*," a comment wherein he is quite justified, as the dioicous species, in particular, at present offer a sufficiently cheerful tangle to anyone desirous of unravelling them.

During the past season the writer's attention has been called to some of the species of this genus, which upon examination resolve themselves into *C. myriantha* (Lindb.) Schiffn., and forms of *C. divaricata* (Sm.) Schiffn. Specimens of both have been examined from different parts of New England, *C. divaricata* being reported from all the New England states, while *C. myriantha* is as yet only from N. H., Mass., and Conn., as well as N. Y.

The two have undoubtedly been confused, probably from lack of fertile material. This is perhaps the reason that *C. myriantha* has been hitherto overlooked in New Hampshire, where it is extremely common in the proper sort of stations. It is emphatically a northern species, and its southern range is not yet definitely known. Its paroicous inflorescence at once distinguishes it from its New England allies.

Lindberg first described *C. myriantha* in the proceedings of the Societas pro Flora et Fauna Fennica, Vol. 1, Feb. 6, 1875, as follows: "in which genus *Cephalozia* the president has found two which he suspected to be undescribed species, one of which, by him named *myriantha*, yet possibly could be identical with *J. rubella* Nees. This first named, which he met with in various places about Ladoga, Helsingfors, Stockholm and Ostergothland, is distinguished without difficulty, in that it is the smallest of the genus, through simple plants, larger and broader leaves, especially toward the apex of the stem, where they are strongly serrate, and consisting of rounded, strongly thickened cells, together with paroicous inflorescence."

Spruce does not pay very much attention to *C. myriantha* beyond quoting Lindberg's northern stations for it, but he describes *C. Jackii* Limpr. at somewhat greater length, and quotes German stations, with notes concerning certain German specimens seen by him.

Warnstorf gives an excellent description of *C. Jackii* in Kryptogamenflora der Mark Brandenburg, p. 230, but makes no mention of *C. myriantha*.

Schiffner, however, in Bryologische Fragmente No. 7, discusses *C. Jackii* and *C. myriantha* in detail, and concludes that they are identical. He says that it was first supposed that *C. myriantha* was the northern, and *C. Jackii* the central European form, but finds among his Norwegian specimens some labelled *C. myriantha*, which are good *C. Jackii*, according to the descriptions.

C. myriantha was first collected in New Hampshire by the Sullivant Moss Society's committee on Mt. Lafayette, during the Appalachian Mountain Club's meeting of July, 1908.

It is common on all the summits about Waterville, N. H., descending also into the valley. It is a true xerophyte, growing on dry exposed barren

soil, and on ledges of rock, mixed with *Polytricha* and lichens. In its most luxuriant form it is dark red, and prostrate, producing in great abundance its capsules, which mature about the first of August. The perianths are whitish and hyaline in the upper part. A heavily fruited patch is quite distinguishable with the naked eye, with a little practice.

One of its colonies looks not unlike one of *Marsupella ustulata*, except that it is dark red instead of almost black. With a lens the creeping stems have the appearance of little chains, like *Temnoma*, the leaves on robust stems being quite imbricated.

The White Mountain specimens are much more robust and deeply colored than those from the trap ledges about Hartford. While equally common, it is green, and but little pigmented, being apt, especially the fertile plants, to grow mingled with tufts of *Leucobryum*.

Dr. Evans says "the paroicous inflorescence may be demonstrated by mounting a stem with a perianth or ♀ inflorescence by itself, crushing it by rubbing the cover glass gently to and fro, and then examining the debris. You will then have little trouble in finding archegonia, and the antheridia, although empty and shriveled, will still show their stalks, consisting of a single row of cells, and their thin and delicate walls."

The lobes of the involuclal leaves of *C. myriantha* are broad, with a narrow sinus, lobes jagged-serrate, and hardly bleached out, except on the outermost edges. Cells very thick-walled. The stem leaves of good robust plants are practically secund, much broader in outline, and with a much narrower sinus than those of *C. divaricata*. *Cellulae minutulae pulchre guttulatae*. Vegetative reproduction by means of oval gemmae on the tips of sterile shoots.

The writer has examined specimens of *C. myriantha* from Mts. Lafayette, Osceola, Tecumseh, Sandwich Dome, Carrigain, and the Scaur, from altitudes ranging from 5300-2300 ft., and from Connecticut stations along the Talcott Range, at an average altitude of 500 ft.

In regard to *C. divaricata* (Sm.) Schiffn. European writers differ as to what is the true *C. divaricata*. Spruce includes in this species many forms, the two most important of which, however, are separated by Warnstorf into *C. divaricata* (Sm.) Warnst. and *C. byssacea* (Roth.) Warnst., distinguished by what would seem good and sufficient characters, as follows:

C. divaricata. Leaf lobes divergent and cell-walls thin, involuclal bracts, with long, narrow lobes, entire or subentire, bleached only on edges, inflorescence elongate-clavate, underleaves only in the inflorescence. Plant of damp localities.

C. byssacea. Leaf lobes broader and with a narrow sinus, cell walls rather thick, but not as much so as in *C. myriantha*, involuclal bracts broader than in *C. divaricata*, spinose-dentate, hyaline in the upper part, cells thick walled. Inflorescence rosette-shaped. Underleaves variable, but present in the inflorescence. Plant of dry ground.

Stephani and Massalongo agree with Warnstorf, but Schiffner does not. "He states that *J. divaricata* Sm. = *J. byssacea* Roth., and keeps Smith's.

name for the plant with spinose-dentate bracts, considering the two species synonyms, and thus leaves Warnstorf's *C. divaricata* without any name at all. So he names this *C. trivialis* Schiffn. n. sp., and it is so listed by various other writers. It has not apparently been formally published. Therefore, at present, *C. byssacea* Warnst. = *C. divaricata* Schiffn. while *C. divaricata* Warnst. = *C. trivialis* Schiffn."

Schiffner says "the thickenings of the cell-walls in the species of *Cepha. loziella*, according to my previous investigations, vary extraordinarily, according to the damper and shady, or sunny and dry station, and certainly to a high degree depend directly upon the station."

Spruce says of *C. divaricata* (Sm.) "Habitat, on the ground, on stones, or decaying wood, or overrunning other mosses, but always in a humid site, whether shaded or exposed. Probably dispersed throughout the northern temperate zone, in the southern, and between the tropics, replaced by closely related, but distinct species. It abounds equally in plains and mountains, but rarely ascends above the subalpine region."

In Macoun's Catalogue of Canadian Plants, Part, VII, 1902, are given numerous stations for *C. divaricata* (Sm.) Dum., ranging from Greenland, Labrador, Nova Scotia, to Lake Superior, Vancouver, British Columbia, and Alaska, but there is no mention of *C. myriantha*.

As, however, in these stations when the habitat is mentioned, it is, "wet places, damp rocks," etc., the specimens may be assumed to be good *C. divaricata* (Sm.) Dum.

In preparing sterile and etiolated forms of *C. divaricata* for examination, it comes up in tufts of parallel stems, looking, on the slide, like minute bunches of asparagus.

Underwood, in Gray's Man. 6 Ed. 1889, does not refer at all to *C. myriantha*, but describes, p. 712, *C. divaricata* (Sm.) according to Spruce. He says however, "dry rocks and sand, pine barrens of N. J. and northward" which seems to point to *C. byssacea* (Roth.) Warnst.

All the fertile specimens collected by the writer in Connecticut apparently should be referred to *C. divaricata* according to Schiffner as they have the spinose-dentate bracts, which is the form listed in the Report on the Conn. Bryophytes. The sterile specimens, from damp rocks, are much etiolated, and might belong to either form.

From the range of stations given, these species are obviously of those who are not unduly particular in the matter of the geological substratum of their habitats. The White Mountains are mostly potassic rocks, with much glacial drift in the valleys, while the trap rocks about Hartford contains a little lime.

Most of these small and, to superficial observation, retiring hepaticae, are most fastidious in their choice of habitat, but, when the combination of characters requisite to their satisfaction is once worked out, the collector has but to put his hand upon them,

Schiffner, in an obituary notice of Limpricht, alludes to Bryology as "diesen lebenswürdigsten Spezialgebiete der *Scientia amabilis* welches aber zugleich zu den schwierigsten gehört." Although this especial genus is confused and vexatious, nevertheless, it is far too interesting to merit neglect.
Hartford, Connecticut.

NOTES ON NOMENCLATURE X.

ELIZABETH G. BRITTON.

Part 231 of Engler and Prantl Pflanzenfamilien was received on July 16th, 1908; it includes pages 1009 and 1056 completing the *Thuidieae* and beginning the *Hypnaceae*. The genus *Thuidium* includes 28 species found in North America, separated into five subgenera, and *Helodium* (Sull.) Warnst. (*Elodium* Sull.) is maintained with three species.

The Hypnaceae are divided into four subfamilies as follows; 1, *Amblystegieae*; 2, *Hylocomieae*; 3, *Stereodanteae*; 4, *Plagiothecieae*, only the first two are included in this part. The *Amblystegieae* are divided into ten genera, all occurring in North America; these are *Amblystegium* with 19 species, *Amblystegiella* four species, *Homomallium* two species, *Hygroamblystegium* four species. *Amblystegium Lescurii* Sull. with its thickened rough margin is very properly transferred to the genus *Sciaromium* founded on three South American species in which this is characteristic. A rigid interpretation would pronounce *Hygroamblystegium filicinum* the type of *Cratoneuron* Sull. which includes five of our species, *C. commutatum* being only incidentally mentioned by Sullivant. *Drepanocladus* includes 17 species and is subdivided into seven sections; *Calliergon* contains seven and *Acrocladium cuspidatum* stands as our only species. *Hygrohypnum* has 16 species which have been familiar to us as *Limnobium*. *Camphylium* includes 18 species, but a careful revision of the genus would probably reduce this number.

The *Hylocomieae* include a number of genera not found in North America. *Ctenidium* is maintained with three of our species, *C. molluscum* being figured. The generic name *Microthamnium* is retained in preference to *Stereohypnum* as used by Professor Fleischer and *Mittenothamnium* Hennings, a question which is open to discussion; eighteen species are known to be tropical American, one only having been found in Florida.

Parts 232-233 were received December 22d, 1908, containing pages 1057-1152, completing the *Hylocomieae* and including the *Stereodanteae*, *Plagiothecieae*, *Leucomiaceae*, *Sematophyllaceae*, *Rhegmatoxontaceae* and part of the *Brachytheciaceae*. *Rhytidiopsis* Broth. is described to include *R. robusta* (Hook.) of the western states, *R. rugosum* remaining in *Rhytidium*. *Hylocomium* is limited to four of our species. Perhaps the most surprising result of the subdivision of the *Hypnaceae* is that the genus *Hypnum* is reduced to one species, *H. Schreberi* and that the citation is Dillenius Catalogue Gissam p. 215, 1718. It would seem more correct to have cited it as *Hypnum* (Dill. L.) as the method of arriving at the type has been by exclusion of all the Linnaean species that have been referred to other genera, leaving *H. parietinum* L. which raises the question why this specific name dating to 1753 should not have preference over *H. Schreberi* of 1787 especially since the priority of the *H. proliferum* L. is recognized!

The *Stereodanteae* are divided into eight genera of which four are North American. *Ptilium crista-castrensis* is the only species in the first genus. *Ectropothecium* has seven of which *E. caloosiense* only, is known in Florida. *Stereodon* includes the "proper *Hypnums*" of Lesquereux & James' Manual

and is divided into four subgenera with 35 species of *Drepanium* a number which can be materially reduced; three of *Heterophyllum* and under Section IV. *Pseudo-Raphidostegium* Brotherus finds a new section where we are surprised to meet *S. recurvans* and *S. delicatulus*. This transfer is open to serious question as there seems to be no good reason for not placing these species with their closely related allies in the *Sematophyllaceae* in section *Cupressinopsis* on pp. 1109 and 1110, where their inflated alar cells and rostrate lids properly place them!

The *Plagiothecieae* are subdivided into *Isopterygium* with 22 species; *Plagiothecium* with 16 species; *Catagonium* C. M. with one species from Panama; *Taxithelium* with three species of which *T. planum* occurs in Florida. *Vesicularia* C. M. is maintained as distinct from *Ectropothecium* and *V. amphibolum* and *V. vesicularis* are transferred to this genus.

The *Leucomiaceae* are a small tropical family of two genera; two species of *Lecomium* occur in the West Indies.

The *Sematophyllaceae* contain some questionable decisions. It is surprising to find that *Pterogonidium* C. M. 1897 is described and that *Pterogoniella* (Sch.) Jaeger is dropped entirely, presumably because Jaeger subdivided it into *Meiothecium* and *Potanium*. It is quite correct, however, to separate *Pt. pulchella* from *Meiothecium* where Jaeger placed it and to recognize this as a genus with three West Indian species with *Sauloma*, as used by C. Müller, as a synonym. *Raphidostegium* is maintained with five subgenera and 38 species. *Trichosteleum* includes six species and *Sematophyllum* three species, all West Indian and Central American.

The *Rhegmatodontaceae*, contains *Rhegmatoodon* with two Mexican species. The *Brachytheciaceae* are also extensively subdivided including *Homalotheciella* with three North American species, *Homalothecium* with two species, *Pleuropus* with one West Indian species; *Camptothecium* with three subgenera and 13 species; *Scleropodium* with seven species and *Cirriphyllum* which is not completed in this part.

New York Botanical Garden.

LICHEN NOTES No. 9.

***Parmelia latissima* Fée and Two Commonly Associated Species.**

G. K. MERRILL.

The lichens described below have for the most part been correlated under the name of *Parmelia latissima* Fée by our American students. This view, apparently sanctioned by Tuckerman's Synopsis, seems to have met all the requirements of our investigators. No explanation is ready at hand to account for Tuckerman's failure to at least record the synonymy for *P. latissima*, and it may be assumed that he considered the distinctions upon which were based *P. coralloidea*, *P. cristifera*, etc. to be ineffective. A comparison of the description here undertaken for these plants will help to a proper comprehension of the group, and supply data for more intelligent identification.

PARMELIA LATISSIMA Fée Essai Cryptog. Suppl. (1837) p. 119.

Reaction K_+^+ > crimson, $K(C)$ + cortex alone.

Thallus whitish-glaucous, expanded, orbicular, membranaceous but rigid, appressed but loosely adherent, lobate, the divisions broad, rather radiate, margins sinuous, unbroken at the periphery, where rounded and depressed; centrally uneven and puckered, somewhat imbricate, the borders elevato-decurved; above smooth, opaque or somewhat shining, destitute of soredia, isidia, or cilia; within white; below black and sparsely rhizino-se, at the circumference yellowish or brownish and broadly glabrous. Apothecia short pedicellate, cup-shaped, disk reddish, imperforate, margin entire, sometimes incurved exciple smooth or at length scrobiculate. Spores ellipsoid $\frac{9.4-8.2}{1.5-1.1} \mu$.

This is a tropical species, but should be found within the southern limits of the United States and in the Central American region. There is no record of its occurrence in Continental North America however, that may be interpreted as applying to the plant here defined.

PARMELIA CORALLOIDEA (Mey. & Flot.) Wainio Etude Bresil I, p. 33; *P. perlata* var. *coralloidea* Mey. & Flot. in Act. Ac. Leop. Nat. Cur. XIX, Suppl. I (1843), p. 219; *P. tinctorum* Despr.; *P. praetervisa* Müll.; *P. perlata* var. *platyloba* Müll.

Reaction K_+^+ , C_+^+ intense red, Wainio.

Thallus whitish or cinereo-glaucous, sometimes centrally dirty-cinereous, broadly expanded, orbicular, rather appressed but not adherent, lobate, the divisions ample, margins slightly decurved, sinuous, at the periphery rounded or broadly crenate, depressed and plane, centrally confusedly uneven and puckered; above opaque or slightly shining, destitute of soredia, or cilia, but more or less isidio-se; within white; below black, at the circumference yellowish-brown and glabrous, smooth or minutely rugose centrally and here and there slightly rhizino-se. Apothecia cup-shaped at length explanate, disk rufescent, continuous or sometimes perforate, the margin commonly entire but sometimes fissured, the exciple smooth or isidio-se. Spores $\frac{11-15}{6-8} \mu$. Invariably smaller than in *P. latissima*. As observed by the writer the greatest length for spores has been 18μ , that for diameter 10μ .

The plant is commonly found on trunks of trees, sometimes on shrubs, and often on fences and palings.

Examined from St. Martinville, La., A. B. Langlois, the specimen having been identified by Nylander as *P. latissima*; in another example from the same locality and collector, issued by Miss Cummings No. 122 L. B. A. as *P. latissima* with the note "differs from the type in being isidiophorous;" Okefenokee Swamp Ga., L. P. Ricker; Thomasville, Ga., Mrs. Taylor; vicinity of Sanford, Fla., S. Rapp; and Island of Jamaica, Miss C. E. Cummings. Reported from Mexico, Dr. Maury.

The species strongly resembles *P. latissima* in appearance, but may be readily distinguished by the reaction, the isidia, and the smaller spores.

PARMELIA CRISTIFERA Tayl. in Hook. Jour. Bot. 1847, p. 165; *P. latissima* forma *cristifera* (Tay.) Hue Lich. Ex.-Eur. I, p. 105. *P. glaberrima* Krempf. pro maxima parte.

Reaction K^+ , C^- , $K(C)^+$ reddish.

Thallus white or whitish-glaucous, expanded, orbicular, membranaceous but rigid, appressed but not adherent, lobate, the divisions broad and rather confusedly radiating, sub-imbricate centrally, at the circumference rounded depressed and plane, the margins there sinuous or faintly crenate, centrally undulate, cristate-ascendent and beset with globose or limbate commonly aggregated soredia; above smooth, opaque or somewhat shining, eciliate and destitute of isidia; within white; below blackish or brownish and sparsely rhizinose, at the circumference paler and glabrous. Apothecia as in *P. latissima* but often explanate, imperforate. Spores in the few fertile examples examined smaller than those for *P. latissima*. On old logs, trunks of trees, fence posts and rocks.

Examined from Jacksonville, Fla., W. W. Calkins; vicinity of Sanford, Fla., S. Rapp; and from the Hawaiian Islands, A. A. Heller.

The distinctiveness of this plant specifically, rests on the reaction elevated margins of the lobes, and the markedly cristate-aggregated soredia. Another factor that serves to separate the species from *P. latissima* is furnished by the failure of our southern collectors to discover anything reconcilable with the latter as here defined.

Rockland, Maine,

LICHENS OF THE MOUNT MONADNOCK REGION, N. H. No. 3.

(See BRYOLOGIST, XI: March and July, 1908).

REGINALD HEBER HOWE, JR.

GENUS; PARMELIA (Ach.) DeNot.

32. PARMELIA PERLATA (L.) Ach. Three fertile specimens, two thus labelled, one marked "perferata." (Fitzwilliam, not uncommon).

33. PARMELIA PERFORATA (Jacq.) Ach. One fertile specimen belongs here.

34. PARMELIA CETRATA Ach. Two specimens, one labelled "*perforata*" belong here (Fitzwilliam, uncommon.).

35. PARMELIA TILIACEA (Hoffm.) Floerk). Two fertile specimens labelled thus, and two fertile specimens labelled "*Parmelia Scorea*" (included with *tiliacea* by Fries), one fertile specimen at first labelled "*P. Russellii*," also seven fertile specimens unlabelled belong here (Fitzwilliam, common.). All these by chemical criteria show the following results: K^+O^- , $K(C)^+$ red, which is in no way comparable with the results tabulated by Mr. G. K. Merrill in his recent paper on the genus. (BRY. XI: p. 92; 1908.)

36. PARMELIA BORRERI RUDECTA Tuckerm. One specimen labelled "*P. Russellii* white fibres." Two fertile sperimens labelled "*P. Russellii*," and an unlabelled specimen belongs here. (Fitzwilliam, uncommon.)

37. PARMELIA SAXATILIS (L.) Ach. Three sterile specimens, two of which are labeled "*saxatilis*." (One first labelled *omphalodes*.).

38. PARMELIA SAXATILIS SULCATA Nyl. Twelve specimens, two labelled "*P. saxatilis sulcata*" (one had before been labelled "*Physcia caesia* v. *stellata*" and another "*Pyxine Frostii*") belong here. Also one specimen "*P. laevigata*." (Fitzwilliam, common.)

39. *PARMELIA SAXATILIS FURFURACEA* Schaer. Five specimens, three fertile, three labelled "*saxatilis*," and two unlabelled belong here. One specimen labelled "*P. saxatilis, omphalodes*" is *Physcia pulverulenta leucoleiptes*.

40. *PARMELIA PHYSODES* (L.) Ach. Six specimens, one fertile. Four are labelled *enteromorpha*, all belong here. The forms *platyphylla* and *labrosa* are represented if recognized. One small unlabelled specimen probably belongs here.

41. *PARMELIA PHYSODES VITTATA* Ach. Two infertile specimens, both labelled *enteromorpha* (and one specimen of the original collection made in April, 1906) belong here. If the form *hypotrypodes* Nyl. be admitted these belong with it:

(?) *PARMELIA COLPODES* (Ach.) Nyl. Five fertile specimens. One had been labelled *physodes*, and corrected—though its identity as no spores are found is still doubtful. I do not believe these specimens were collected in this region, nor the following:

PARMELIA PERTUSA (Schrank.) Schaer. Six sterile specimens. Five are labelled "*terebrata*," and one corrected to "*pertusa*." Four of the above are labelled with the remarks "holes" or "holes bored."

42. *PARMELIA OLIVACEA* (L.) Ach. Two fertile specimens labelled thus, belong here. (Fitzwilliam, common.)

43. *PARMELIA OLIVACEA ASPIDOTA* Ach. Two fertile specimens, one labelled thus, the other "*olivacea*," belong here.

44. *PARMELIA OLIVACEA PANNIFORMIS* Nyl. One sterile specimen thus labelled and one labelled "*aspidota*," belong here.

45. *PARMELIA OLIVACEA SOREDIATA* (Ach.) Nyl. Two sterile specimens. (The specimen formerly questionably referred here is so worn that its absolute determination is impossible.)

46. *PARMELIA STYGIA* (L.) Ach. Nine specimens, four fertile, and labelled. Two are from Monadnock, one from "Huggins Hill," and one from "Mt. Carrigan." (I collected on the upper bare ledges of Monadnock, on Nov. 3, 1907, this lichen, No. 571. It grows abundantly but I did not find it fruited. Also reported from Mt. Monadnock, J. L. Russell, see Tuckerm. Syn. 1882, p. 63.)

47. *PARMELIA CAPERATA* (L.) Ach. Four specimens, three labelled, of which two are fertile. (Fitzwilliam, common.)

48. *PARMELIA CONSPERSA* (Ehrh.) Ach. Eight specimens, six fertile. Five are labelled "*conspersa*," four "*v. stenophylla*," one unlabelled. Five belong below, two of which are referable to the form as follows:

49. *PARMELIA CONSPERSA ISIDIATA* (Anzi.) Hue.

50. *PARMELIA CONSPERSA STENOPHYLLA* Ach. Three specimens, two labelled thus, and one unlabelled. (All three forms are common in the Monadnock region.)

51. *PARMELIA CENTRIFUGA* (L.) Ach. Six specimens, one fertile, four labelled. The fertile one is from "Monadnock," another from "C. C. Frost," the shoemaker botanist of Vermont. One specimen first labelled "*P. conspersa*?" afterwards changed to "*P. incurva*" belong here.

52. *PARMELIA INCURVA* (Pers.) Fr. One specimen, thus labelled.

53. *PARMELIA AMBIGUA* (Wulf.) Ach. Three specimens all thus labelled. (There is also a specimen in the Sprague Collection, Boston Society of Natural History, from Monadnock. These specimens labelled "*Parmelia ambigua albescens* Wahl." are evidently *P. stellaris*.)

TO BE CONTINUED.

Concord, Mass.

LICHENS OF BALTIMORE AND VICINITY.

(Abstract of Talk given at Sullivant Moss Society Meeting, Baltimore, 1908.)

CHARLES C. PLITT.

The collection consists of 148 specimens representing 30 genera, containing 107 species and their varieties. Nearly all have been collected in the immediate vicinity of Baltimore. In the naming of specimens I have depended a great deal upon our friend Mr. Merrill who has kindly looked at nearly everything I have collected. In the arrangement of specimens I have followed Engler and Prantl as best I could. A glance at the series will show that *Cladonia* alone is represented by 53 specimens, over one-third of the whole. This would seem to show that Baltimore is particularly well represented in this genus. This is true; but I think that this high showing is due to a great extent to our much better knowledge of the *Cladonias*, and when we have a more thorough knowledge of other genera there will also be a marked increase in numbers of specimens representing them. To illustrate: the 53 specimens of *Cladonia* represent 26 species and varieties, *Parmelia* will show 14 specimens, representing 12 species; now when we know *Parmelia* better there will also be a marked increase in its varieties.

A few words on our most common lichen will possibly be of interest. Which is our most common lichen will be hard to decide. If one limited his rambles to country roads alone, it no doubt would be *Parmelia Borreri*; if to open woods, *Cladonia sylvatica*; if along railroads, possibly *Baeomyces roseus*. All three are equally common and can surely not have escaped the eye of any tramp in this vicinity. Other more or less common lichens will be the following. Should one go along the banks of any of our rocky rivulets, one is sure to be attracted by the pretty masses of *Endocarpon miniatum* growing on the rocks in the stream sometimes quite submerged. I remember the first time that I noticed it, I felt sure it was *Hydrotheria* for I had read that *Hydrotheria* was the only lichen that lived in that way, but somehow or other my plant would not fit the description, and I soon learned my brook-loving specimen was *Endocarpon*. Should one go through the woods the stains on the tree trunks will surely attract attention, closer examination will possibly reveal *Graphis* with its peculiar hieroglyphic-like markings, or *Pyrenula* with its numerous little elevations as if the bark were blistered, both of which are quite common. Another common lichen is *Lecidea albocærulescens* found on nearly every rock in our wooded areas. It belongs to the crustose type, and may be recognized at once by the peculiar oily-like appearance it gives to the rocks.

Of the *Cladonias* our most common is *sylvatica*, which is so closely allied to *rangiferina*, the true reindeer moss. How I have searched for true *rangiferina*—almost concluding it was not found here—finally, however, I found a little, but growing so sparingly, as if this climate did not suit it at all. Other common *Cladonias* are *papillaria*; *didyma* var. *muscigena*; *cris-tatella*, soon recognized by its beautiful red fruits; *pyxidata*, with its funnel-like stalks; and *verticillata*.

Umbilicaria, so easily recognized when once seen, is rather rare here; my first find of this genus being *U. Dillenii*.

Peltigera, that pretty green lichen with its very broad thallus is quite common. A walk through any wooded ravine is sure to be rewarded by the finding of one or more species of this interesting lichen growing over mosses or on the damp earth.

Parmelia as already stated is well represented by *Borreri* var. *rudecta*. Growing with it one very frequently finds *Pyxine soresdiata*. They look very much alike. I remember collecting both together thinking them one species, but one soon learns to know them apart, besides a little scratch on the thallus soon tells that it is *Pyxine*, if the medulla is yellow, and *Parmelia* if it is white. One of my best finds, probably was the finding of *Parmelia pertusa*. It seems to be quite rare.

Cetraria in so many respects similar to *Parmelia* is also well represented. In our sandy pine-covered regions, I am sure of finding *ciliaris*, *aleuritidis*, and *lacunosa*; but in our hilly regions a pretty find is *Cetraria Okesiana*.

Physcia is represented by eleven specimens. The most common species here is I believe *tribacia*. It was the trying to determine *Physcia hypoleuca* which caused me to become interested in the study of lichens.

Usnea so easily recognized, is not over common and seems to be disappearing. It delights to grow in moisture laden regions and as these disappear by the cutting down of the trees, and the better draining of the land, *Usnea* also disappears.

I might dwell on other and less common species but will come to a close with this pretty little plea for the study of lichens by the Rev. J. S. Cutler: "When all the birds have left us and flown away to far off sunny climes; when the last frost-flowers have drooped and faded; and the last withered leaf has fallen in the silent woods; there still remains for the true lover of Nature a rare treat in the study of those faithful little children of the rough and rugged places—the lichens. No biting frost can frighten them; no bellying of the north wind can disconcert them nor disturb their calm serenity. Steadfast, undaunted, brave, sturdy, and faithful, they cling to the bare flinty surface where they abide, to prove that, in spite of winter and storm and desolation, there is still one warm spot in Nature's heart."

Baltimore, Maryland.

CURRENT LITERATURE.

La Flore Bryologique des Terres Magellaniques, de la Georgie du Sud, et de l'Antarctide, par Jules Cardot.

JOHN M. HOLZINGER.

In 1901 Mr. Cardot published the "Flore Bryologique des Terres Magellaniques." This was based on the collections brought back by the Belgian Antarctic Expedition, and was briefly reviewed by the writer in THE BRYOLOGIST, Feb. 1902, p. 28. The present work appearing in small quarto form at Stockholm, 1908, is part 8 of Vol. IV, Botany on the Reports on the Swedish South Pole Expedition (Schwedische Südpolar Expedition) of which so far

seven volumes have appeared. The expedition was under the direction of Dr. Otto Nordenskjöld, and extended over the years 1901 to 1903. The *Antarctic*, the vessel that carried the expedition, was shipwrecked, resulting in the loss of a good share of the collections, including part of the mosses. From the material saved the author determined not less than 201 species, of which 137 belong to the Magellanic Region including the Fuegian Archipelago and the Falkland Islands; 80 belong to South Georgia, and 23 to the Antarctic Region proper. Of this number 65 species are new to science, four of these serving as the types of new genera. Mr. Carl Skottsberg, the botanist of the expedition, is honored for his courage and perseverance by having dedicated to him one of these genera, *Skottsbergia paradoxa*, a most curious dicranaceous moss with asymmetric peristome.

The work covers 298 pages, accompanied by eleven plates superbly executed by the author himself, who shows here again, as in all his publications, the artist as well as the scientist, both of the first order. These plates illustrate fourteen of the new species, namely: *Andreaea verruculosa*, *A. pumila*, *A. heterophylla*, *Skottsbergia paradoxa*, *Verrucidens turpis*, *Pseudodistichium austrogeorgicum*, *Grimmia antarctici*, *Orthotrichum vitalum*, *Tayloria Dubyi*, *Bryum cephalozoides*, *Exodokidium subsymmetricum*, *Bartramia leucocolea*, *Conostomum perangulatum* and *Breutelia Skottsbergii*.

In addition 61 figures are printed in the text, which falls into three parts:

First. La Flore Bryologique des Terres Magellaniques, pp. 4-187, establishing 243 endemic species out of 444 now known.

Second. La Flore Bryologique de la Georgie du Sud, pp. 188-240, showing 42 endemic species out of 93 known.

Third. La Flore Bryologique de l'Antarctide, pp. 241-282, with 24 endemic species out of 47 known.

By his keen analytic method, the author compares what is known of each flora, not only from the Swedish expedition, but from all previous sources of information, with the adjacent floras here discussed, as well as with those of Tasmania, New Zealand, Northeastern Asia and our arctic region. After the critical chapters, there follow, in each case, systematic lists of the regions discussed.

To enter into the details of the findings in their critical comparisons is not possible in a short review. Suffice it here to state that the author shows conclusively that the Magellanic moss flora shows closer affinity to the Australian moss-flora than to that of Patagonia. And the intervening groups of islands, of Falkland, South Georgia, Kerguelan Land, together with the Auckland and New Zealand groups, are probable the highest outcroppings above the ocean surface of once continuous or nearly continuous land-mass. In summing up the problems presented in the moss flora of the Antarctic continent, Mr. Cardot closes thus:

"What are the origins of this flora? The question touches closely on the problems of the origins of the South Continental flora. Should one recognize in the present Antarctic flora a direct or actual picture, weakened to be sure,

of the plant life of the ancient Southern Continent? Or must one, on the other hand, attribute to it a more recent origin? The answer seems quite difficult. Yet, since it seems established that South Georgia, the Fuegian Archipelgo, that of Falkland and Southern Patagonia, have since the disappearance of the Southern Continent, been visited by one or several glacial period, during which these regions experienced climatic conditions analogous to those existing to-day in the Antarctic Continent, one must admit that in the same epoch every manifestation of life ought to be impossible in the higher latitudes. One is led for this reason, to consider the present Antarctic flora as a result of a slow re-immigration [of the Southern (Continental) flora, with evolution of species under the new climatic conditions to which it needed to adapt itself. The character of series rather than of species which several of Antarctic mosses offer (as *Dicranum Nordenskjoeldii* Card., *Bryum amblyolepis* Card., *Polytrichum antarcticum* Card., etc.)—and furthermore to confirm this hypothesis.”

It should be stated that Mr. Cardot had, previous to the publication of this comprehensive work, published “Preliminary Notes,” both in the *Revue Bryologique* and in the *Bulletin de l'Herbier Boissier*.

Winona, Minn.

REVIEW—THE BRYOPHYTES OF CONNECTICUT.

By ALEXANDER W. EVANS and GEORGE E. NICHOLS, being Bulletin No. II of the State Geological and Natural History Survey of Connecticut.

This is a model for local lists of plants of any kind. There is a very satisfactory account of “The General Characteristics of the Bryophytes” and a similar account of each of the six orders: I. Marchantiales; II. Jungermanniales; III. Anthocerotales; IV. Sphagnales; V. Andræales; VI. Bryales; given in clear language free from unnecessary technicalities.

No descriptions of genera or species are given but there are good serviceable keys to both. A list of localities and distribution is given for all species, and exsiccatae and references are cited in case specimens from Connecticut are distributed or referred to.

The arrangement for the most part is that of Engler and Prantl's “Die Natürlichen Pflanzenfamilien,” The principal exceptions being the hypnoid mosses and the *Polytrichaceae*, where Warnstorff's treatment is followed to some extent. The *Polytrichaceae* are considered the most highly developed of the Bryales and are placed last, an arrangement with which, at present, I am unable to agree because of the comparatively simple nature of the peristome. Neither am I able to include *Schwetschkeopsis denticulata* (*Leskea denticulata* Sulliv.) and *Homalothecium subcapillatum* with the *Entodontaceae*. Neither am I able to understand why *Rhynchostegium rusciforme* B. & S. is put under *Eurynchium* while *Hypnum serrulatum* Hedw. is put under *Rhynchostegium*. There are some other things of a similar nature to which I should take exception. There are also a few cases of “nomenclature” to disagree with. These are minor matters as the chief value of such

a work is in the facts it records, not in the opinions promulgated or adopted, a view which seems not to be universally held in such cases.

Three hundred and eighty-seven species are listed, of which two hundred and forty-seven are Bryales, ninety-two are Jungermanniales, and thirty-one are Sphagnales. Of the three hundred and eighty-seven species only sixty-eight are peculiar to America. Apparently great care has been taken to make the list as complete and accurate as possible. No student of the mosses of the Northern United States can afford to be without the list and its price is merely nominal (thirty cents). Inquiries should be addressed to George S. Godard, State Librarian, Hartford, Connecticut.

New Dorp, N. Y.

A. J. GROUT.

REPORT OF THE SULLIVANT MOSS SOCIETY MEETING.

The fifth public meeting of the Society was held on Wednesday, December 30, 1908, at Baltimore, Maryland, in connection with the American Association for the Advancement of Science, then holding its sixtieth meeting. We were assigned a room in the Eastern Female High School Building. Prof. Bruce Fink presiding, called the meeting to order at 2 P. M. At this same hour in a near by room was a joint ecological symposium of the Botanical Society of America and Section G of the A. A. A. S., and Prof. Fink having a paper there was obliged to leave early in our session. Miss Lorenz read her paper on the "Genus *Cephaloziella*" which is printed in this number of THE BRYOLOGIST. Prof. Fink then called Dr. Alexander W. Evans to the chair and presented his own paper on "Licheno-ecologic Notes from Beechwood Camp" also given in this number, with three illustrations.

The third paper called for was "Notes on the Structure of the Genus *Sphaerocarpus*, and its place in Systematic Botany," by Miss Caroline C. Haynes, read for her by Dr. Evans. Original drawings from nature were shown illustrating all known species of the Genus *Sphaerocarpus* (except one from Chile) including a new species from the State of Washington, here referred to and illustrated for the first time as *Sphaerocarpus hians*. These drawings form part of the work of monographing the genus, to be published later in the Bulletin of the Torrey Botanical Club.

The fourth paper was read by Mr. Reginald Heber Howe, Jr. on "A Preliminary Review of the Genus *Usnea*, as Represented in New England." This will appear later in Torrey Bulletin. Mr. C. C. Plitt followed with a paper on "The Lichens of Baltimore and Vicinity" illustrated with especially prepared specimens. The paper is given in this number. Mrs. Carolyn W. Harris then gave a most interesting talk on a series of 100 beautifully mounted specimens of lichens collected at Mt. Meenahga, in the Catskill Mountains the past summer, made chiefly for the purpose of interesting the guest of the hotel in this group of plants and by their being on constant exhibition there act as a stimulation to others to make further collections and studies. We shall give this later on with notes. The seventh and last item of the formal program was a talk by Mr. Wm. B. Davis on "The Preparation of Photographs of Various Microscopic Objects, and General Technique."

The meeting was adjourned at 4 P. M. and resolved itself into an informal reception which was thoroughly delightful. The various Exhibits were then more closely inspected. Miss Mary F. Miller had sent a choice collection of sheets from the Society Lichen Herbarium. Miss Lorenz showed specimens of Hepatics, and her "Note Book" containing a fine series of figures drawn from nature of whole plants (Hepatics) and microscopical details. Some of these have been reproduced in THE BRYOLOGIST and we are promised more in the future. Miss Haynes showed sample pages and figures drawn from nature prepared for a proposed Manual of the Hepaticae of the Eastern, Southern and Middle States this side of the Rocky Mountains.

Mr. Plitt drew attention to the advantages of his arrangement of lichens in glass boxes these permitting the upper and lower sides of the specimen to be easily observed. The little glass cases are held together by what are known as "insect mounting strips" and can be obtained from A. I. Root & Co., the "bee" people of Medina, Ohio, who make the well known honey boxes. These boxes are made from strips of wood, each box of one strip Mrs. Josephine D. Lowe was present and showed some of her lichens and hepatics collected in Nova Scotia, several being very rare, and one, at least, new to North America. The list is given in this number. Mr. Davis showed a fine collection of *Myxomycetes* most beautifully mounted. Copies of the January BRYOLOGIST were distributed having been published a few days in advance for the purpose.

The attendance was smaller than at the New York meeting, but the members and friends present expressed great pleasure at the opportunity for making and renewing acquaintances as well as enjoying the program arranged for them. A number of letters of regret were received especially a cordial one from our President, Dr. Frye, also one from Dr. A. LeRoy Andrews.

SECRETARY, pro. tem.

GEORGIA GENICULATA IN NEW HAMPSHIRE.

Attention is called to the omission of the name of the author, Miss Annie Lorenz, from the article on "*Georgia geniculata* in New Hampshire," on page 10 of THE BRYOLOGIST for January, 1909. It was given in the Table of Contents on the cover, but was overlooked in the article itself.

Mr. N. H. Dixon of Northampton, England, under date of January 15, 1909, writes "To the distribution of *Georgia geniculata* (BRYOLOGIST, XII, p. 10) may be added Labrador, as I have a specimen from L'Anse au Clair, Labrador, sent me and collected by Rev. A. L. Waghorne."—Editor.

HEPATICS AND LICHENS COLLECTED IN NOVA SCOTIA.

JOSEPHINE D. LOWE.

(Presented at the Sullivant Moss Society Meeting, Baltimore, Dec. 30, 1908).

July, August and a part of September, 1908, was spent in Sandy Cove, Nova Scotia. This place is situated on Digby Neck about 20 miles from Digby, and at the narrowest part of the neck. The Bay of Fundy and St. Mary's Bay nearly meet at this place, it being only about fifteen minutes walk across.

It is very rocky and many Spruce and Cedars among the trees. The nearness to the two bays creates a climate that all Cryptogams love. Such a wealth of mosses, lichens, and hepatics would be hard to believe could exist in so small a place if not seen. My collections including algae, mosses and a few biological and geological specimens nearly filled a barrel and I can truly say they would not be missed. I have not yet examined the mosses and algae but through the great kindness of Miss Haynes, and Dr. Evans for the hepatics, and Miss Miller and Mr. Merrill for the lichens, I am able to report the following. The species starred I have in quantity for distribution, the postage averaging about one cent for each specimen desired.

Hepatics.

Porella platyphylla (L.) Lindb.

**Ptilidium pulcherrimum* (Web.) Hampe.

" *ciliare* (L.) Nees.

Microlejeunia ulicina (Taylor) Evans. This is new to North America, formerly known from the British Isles, and the neighboring parts of the Continent. Lindberg, in 1875, reported this species from North Carolina, but on a false determination.

**Scapania nemorosa* (L.) Dumort.

" *Bolanderi* Aust.

Lophozia porphyroleuca (Nees) Schiffn.

" *barbata* (Schreb.) Dumort.

**Lophocolea heterophylla* (Schrad.) Dumort.

**Lejeunea cavifolia* (Ehrh.) Lindb.

**Frullania Asagrayana* Mont.

**Frullania Tamarisci* (L.) Dumort.

**Radula complanata* (L.) Dumort.

Calyptogeia Trichomanis (L.) Corda.

Bazzania trilobata (L.) S. F. Gray.

Lichens.

Parmelia trichotera Hue. Equivalent to *P. perlata* in Nylander's sense, not Tuckerman's. [Never been discriminated by name of *P. trichotera* in this country except by G. K. Merrill.]

Parmelia conspersata (Schau.) Wainio.

**Parmelia physodes* f. *labrosa* (Ach.) Arn.

Parmelia saxatilis (L.) Ach.

Parmelia crinita f. *pilosella* (Hue) Merrill.

Parmelia rudecta (Ach.) Nyl.

**Peltigera aphthosa* (L.) Hoffm.

**Peltigera canina* (L.) Hoffm.

Peltigera rufescens f. *praetextata* Flk.

[Only once recorded from America and this is only the second I have received from this continent, G. K. Merrill.]

**Peltigera polydactyla* (Neck.) Hoffm.

- **Ramalina farinacea* f. *pilosella* (Hue) Merrill.
**Stereocaulon coralloides* Fr.
Stereocaulon paschale (L.) Fr.
Nephroma laevigatum Ach.
**Cladonia multififormis* Merrill.
**Cladonia cristatella* Tuckerm.
Cladonia verticillata v. *evoluta* Fr.
Cladonia squamosa f. *denticollis* (Hoffm.) Flk.
Cladonia gracilis v. *dilatata* (Hoffm.) Wain.
Cladonia furcata v. *scabriuscula* f. *adspora* Flk.
Cladonia sylvatica (L.) Web. f. *laxiuscula* Del.
**Cladonia gracilis* (L.) Willd. v. *elongata* (Jacq.) Flk. Rare.
Cladonia furcata (Huds.) Schrad.
Cladonia furcata (Huds.) Schrad. v. *pinnata* (Flk.) Wain. sub. v. *foliosa* Del.
**Sticta pulmonaria* (L.) Ach.
**Sticta fuliginosa* (Dicks.) Ach. [Uncommon but widely distributed, G. K. Merrill.].
Sticta scrobiculata (Scop.) Ach.
**Sticta amplissima* (Scop.) Mass.
**Sticta crocata* (L.) Ach.
Sticta sylvatica (L.) Ach. [A plant so rare that my herbarium contains no North American representative, G. K. Merrill.].
**Physcia hispida* (Schreb.) Tuckerm.
**Physcia stellaris* (L.) Tuckerm.
Physcia speciosa (Wulf. Ach.) Nyl.
Usnea barbata (L.) Fr. between v. *florida* and v. *dasyypoga* Fr.
**Umbilicaria aphthosa* (L.) Hoffm. v. *papulosa* Tuckerm.
**Leptogium tremelloides* (L. fil.) Fr.
**Theloschistes parietinus* (L.) Norm.
The above were determined by Mr. Merrill, the following by Miss Miller:
Cladonia furcata scabriuscula (Del.) Wainio.
Cladonia pyxidata chlorophaea (Spreng.) Flk.
Cladonia sylvatica (L.) Hoffm.
Cladonia sylvatica sylvestris (Sed.) Wain.
Parmelia Borreri hypomela Tuckerm.
Parmelia pertusa (Schrank) Schaer.
Parmelia saxatilis (L.) Fr.
Parmelia saxatilis sulcata Nyl.
Peltigera polydactyla (Neck.) Hoffm.
Peltigera scutata (Dicks.) Leightf.
Ramalina pusilla (Prev.) Tuckerm.
Ramalina pusilla geniculata Tuckerm.

Washington, D. C.

SULLIVANT MOSS SOCIETY NOTES.

New Members—The revised list January 1st gave 186 members, since then we add the following: No. 187. Mr. D. Lewis Dutton, R. F. D. 2, Brandon, Vermont. No. 188. Mr. C. M. Goethe, 411 J street, Sacramento, California. No. 189. Mr. Arthur S. Browne, Brunswick School, Greenwich, Connecticut. No. 190. Miss Carlotta H. Browne, 871 North 41st street, Philadelphia, Pa. No. 191. Miss Daisy Levy, 329 West 83d street, New York City. No. 192. Mr. W. H. VanSickel 2618 North 33d street, Philadelphia, Pa.

The names of Mrs. J. B. Clapp and Mrs. Rebecca L. Palmer are to be dropped from this year's list as they have withdrawn for the time being.

Please note change of address for Mrs. Josephine D. Lowe to 2622 Woodly Place, Washington, D. C., and Mr. Hollis Webster, to 10 Fairfax Hall, Cambridge, Mass.

OFFERINGS.

(To Society Members only. For postage.)

- Mrs. H. C. Dunham, 53 Maple street, Auburndale, Mass. *Dicranum undulatum* Turn. c.fr. Collected in Maine. *Hypnum ochraceum* Turn. forma st. Collected in Massachusetts.
- Miss C. M. Carr, R. F. D. 3, South Framingham, Mass. *Polytrichum Ohioense* R. & C. Collected in Sudbury, Mass.
- Miss Emily L. Croswell, 20 St. James Avenue Boston, Mass. *Pottia truncatula* (L.) Lindb.
- Mrs. B. J. Handy, 139 Rock street, Fall River, Mass. *Ulotia Americana* (Beauv.) Lindb.; *Brachythecium plumosum* (Sw.) B. & L.; *Bryhnia Novae-Angliae* (Sulliv. & Lesq.) Grout. All c.fr. and collected in Fall River, Mass.
- Mr. W. W. Calkins, Berwyn, Ill. *Barbula unguiculata* (Huds.) Hedw.; *Leskea polycarpa* Ehrh. Both c.fr. Collected in Cook Co.
- Mr. E. B. Chamberlain, 38 West 59th street, New York City; *Fontinalis Kindbergii* R. & C. st. Collected in British Columbia.
- Mr. N. L. T. Nelson, 4509a Cote Brillante, St. Louis, Mo. *Ceratodon purpureus* Brid. c fr. Collected in Missouri.
- Rev. H. Dupret, Seminary of Philosophy, Montreal, Canada. *Thuidium paludosum* Rau & Herv. st Collected near Montreal. *Ramalina polinariella* Nyl. (= *R. pusillageniculata* Tuckerm.) *Buellia geographica* (L.) Tuckerm. Collected in Province of Quebec.
- Mrs. Carolyn W. Harris, The Grafton, Washington, D. C. *Physcia caesia* (Hoffm.) Nyl. Collected on Mt. Meenahga, N. Y.; *Physcia speciosa* (Wulf.) Nyl. Collected at Lakewood, New Jersey.
- Mr. Reginald Heber Howe, Jr., Thoreau Museum Middlesex School, Concord, Mass. *Usnea Virginiana* Ach. Collected in Portland, Oregon, by L. H. Mills. (Unusually luxuriant state.)
- Mrs. Mary E. Williams, The Preston, Warnersville, Pa. *Cetraria Islandica* (L.) Ach. *Hydrotheria venosa* Russell. Collected in the Berkshires, alt. 1600 ft.; *Leskea gracilescens* Hedw. Collected in Kingston, New York.
- Mrs. Annie Morrill Smith, 78 Orange street, Brooklyn, New York. *Scapania nemorosa* (L.) Dumort.. *Porella platyphylla* (L.) Lindb.; *Ptilidium ciliare* (L.) Nees. All collected at Chilson Lake, Essex Co., New York.



MAY 1909



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICES AND LICHENS

FOUNDED IN 1898
By
ABEL JOEL GROUT, Ph.D.

EDITOR
ANNIE MORRILL SMITH

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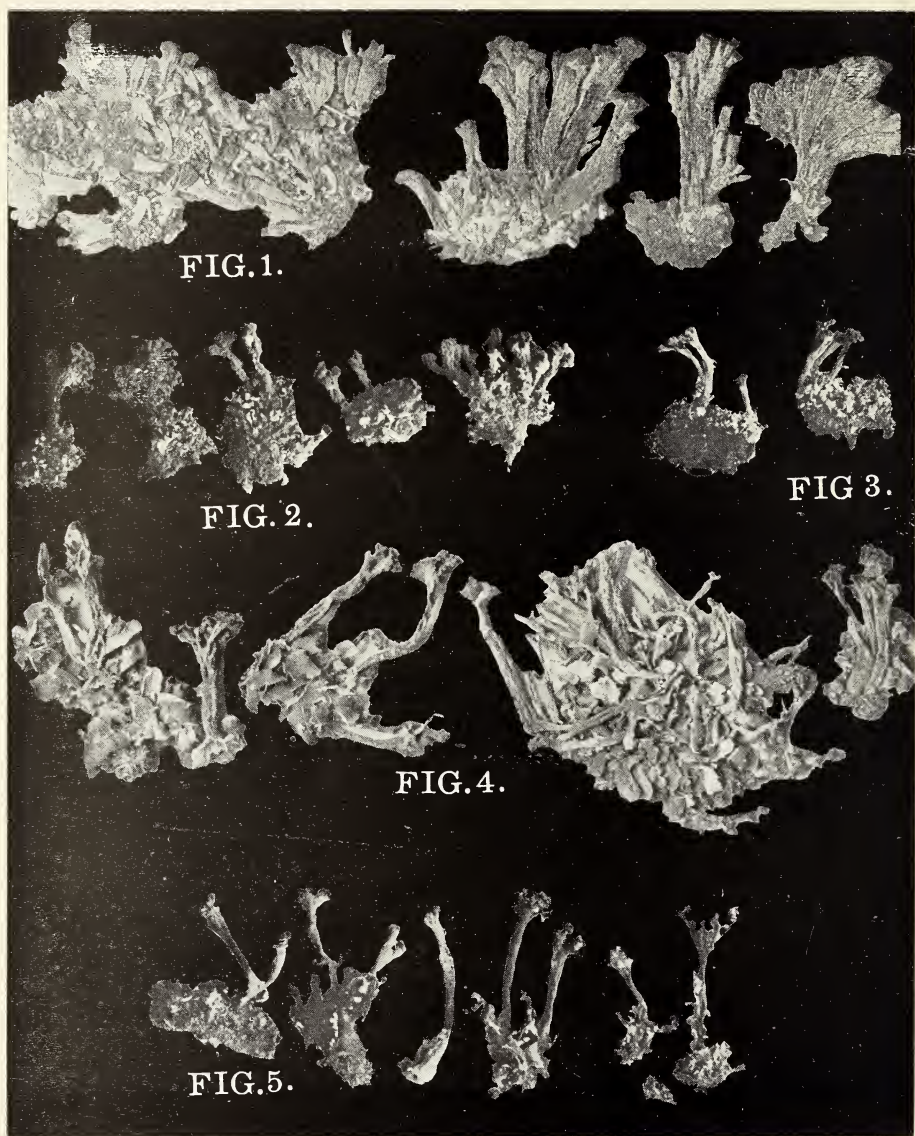


PLATE IV. *Cladonia* Species.

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MAY 1909

No. 3

LICHEN NOTES No. 10.

Cladonia gracilis a, verticillata f. symphy carpia Tuck. and Cladonia symphy carpia Fr., a present view of their identity.

G. K. MERRILL.

Tuckerman in his Synopsis writes of the first plant of our caption, as known only from the coast of Massachusetts. Henry Willey records it in his New Bedford list with the note "very rare," and in Dr. Fink's Upper Mississippi Valley list it is reported from Minnesota. Included in no other American catalogue so far as examined, the plant might be considered as of rare occurrence or else difficult of recognition. As a matter of fact the form is far from uncommon, and assuming that it has been as copiously collected in the past as now, the name or names under which it may sojourn in our American herbaria surely offers a matter for speculative interest. Tuckerman's reason for affiliating the form with *Cl. gracilis verticillata* is not at all obvious to one well acquainted with the characteristics of both. It is possible that the well developed primary thallus of f. *symphy carpia* suggested affinity through the f. *cervicornis*, or in another way the connective hint may have been furnished by the rarely observed tendency of a. *verticillata* to develope with obliterated scyphi. This condition however is too inconstant to be considered other than a mere modification, and while symphy carpeous states of Cladonia forms are often to be noted, the writer has yet to observe any transitional conditions that would serve to conclusively ally f. *symphy carpia* with any known Cladonia species. The podetia of f. *symphy carpia* are distinctly club shaped, and with this fact in view, it is remarkable that Tuckerman should have conceived of a relationship for the form with a. *verticillata*, a scyphiferous type, and at the same time deny to *C. symphy carpia* Fr. a plant of much similarity, a like affinity (so finally assumed by Fries) to *C. pyxidata*. There are three reasons for the almost total failure of American lichenists to recognize f. *symphy carpia*. The first of these is the ineffective description of the plant offered by Tuckerman in the Synopsis; the second is the really excusable error that our students have

EXPLANATION OF THE PLATE IV.

- No. 1. *Cladonia subcariosa* Nyl. (*C. gracilis* a. *verticillata* f. *symphy carpia* Tuck.) the first collected specimen designated by Tuckerman's name.
No. 2. *Cladonia alpicola* (Flot.) Wain. m. *Karelica* Wain. from Knox Co., Maine.
No. 3. Another example of *Cladonia alpicola Karelica* from Central Village, Conn.
No. 4. *Cladonia polycarpia* Merrill (*Cl. symphy carpia* Fr., "macrophylline state"), from the Tuckerman collection.
No. 5. *Cladonia polycarpia* from Maryland.

fallen into of identifying the plant with *C. symphycarpa* Fr.; and the third is our neglect of chemical criteria as a means of determining species. On the loose description given by Tuckerman of *C. symphycarpa* Fr. rests the burden of error in greater part. While the two forms are unlike viewed with the careful scrutiny which comprehends all their points of difference, if the less obvious features of diversity are ignored or overlooked, the description answers satisfactorily for both. The result is that f. *symphycarpia* has been commonly recognized as *C. symphycarpa* Fr. Wainio seems to have been first to point out the true status of f. *symphycarpia* Tuck. by calling attention to the fact that No. 116 of Tuckerman's *exsiccati* as examined in some European copy, afforded the characteristic reaction with KHO of *C. subcariosa* Nyl. The earliest collected example of f. *symphycarpia* in his herbarium as tested by Tuckerman himself affords similar testimony, and personal examination by the writer of the specimens there preserved confirms Wainio's opinion of its identity. As *C. subcariosa* the plant will now be considered. Few of the *Cladoniaea* respond more satisfactorily to the test with KHO than this species. The reaction is K+at length orange-red and even crimson. If our American students desire to ascertain how many examples of *C. subcariosa* Nyl. (nee f. *symphycarpia* Tuck.) are contained among their specimens marked as *C. symphycarpa* Fr., the test will demonstrate most satisfactorily. To the distribution given by Dr. Fink in *BRYOLOGIST* IX, No. 4 for *C. subcariosa* is added: 1. Rock Creek, D. C., T. A. Williams; 2. Putnam Co., Ind., L. M. Underwood; 3. Thomasville, Ga., Mrs. Taylor; 4. Waltham, Mass., W. Gerritson; 5. Sudbury, Mass., Miss C. M. Carr; 6. Morgantown, W. Va., J. L. Sheldon; 7. Catonsville, and 8. Avalon, Md., C. C. Plitt; 9. Island of Jamaica, and 10. Wellesley, Mass., Miss C. E. Cummings; 11. Camden, Maine, Miss A. L. Crockett; 12. Takoma Park, D. C., Miss M. E. Williams; 13. Central Village, Conn., J. L. Sheldon; 14. McCall's Ferry, Pa., A. A. Heller. Of these No. 1 was the only specimen rightly identified when coming to the writer's hands. No. 2 bore the name of *C. symphycarpa* Fr., likewise No. 10, while No. 11 was called its var. *epiphylla*. No. 14 was labelled *C. gracilis*. It may be noted that No. 178 Li. Bo. Am. marked *C. symphycarpa* Fr. is No. 12 of the foregoing. It is not known who identified No. 12 for it was issued under the joint names of Williams, Seymour, and Miss Cummings, but No. 10 collected in 1884 was sent out in the early "New England Lichens" series of the latter. This last originally marked *C. cariosa* (Ach.) Spreng. is revised in my copy in Miss Cummings' handwriting and now reads *C. symphycarpa* Fr. Miss Cummings enjoyed an intimate acquaintance with the Tuckerman collection, and it is difficult not to believe that the specimens marked and published as *C. symphycarpa* or at least some of them were compared with the Tuckerman examples. If this was done and carefully, then those of our lichenists who have not been in touch with authentic material but have determined their symphycarpeous *Cladonia* specimens from Tuckerman's description alone, scarcely need an apologist. A curious fact may be mentioned here that perhaps had some weight in the many erroneous reference of f. *symphycarpia*. According to the

“Synopsis” and the various lists examined, *C. symphyicarpha* Fr. is a widely distributed plant and f. *symphyicarpha* uncommon. The collector would with knowledge of this reputed sharp contrast in distribution be inclined to call his symphyicarpeous plant an example of the commoner species. But on the testimony of the writer’s herbarium it is found that contrary to Tuckerman’s experience and that of some others, *C. subcariosa* (f. *symphyicarpha*) is comparatively common and widely diffused, while the collection contains no specimen marked by others as *C. symphyicarpha* not referable elsewhere, but two examples of that species as elucidated by Wainio, and only two attributable to it in a restricted Tuckermanian sense.

A review of the European synonymy of *C. symphyicarpha* Fr. scarcely aids to an understanding of the American plant, being curiously contradictory. To summarize the various opinions: Th. Fries makes *C. pyxidata* var. *symphyicarpha* (Ach.) Nyl. a synonym of *C. symphyicarpha* Fr. Coemans states that *C. symphyicarpha* Ach. is scarcely to be applied to anything except a condition of *C. cariosa*. Th. Fries affirms that the Acharian species is a composite, one of the elements being *C. cariosa*. Wainio’s view is that the species belongs with *C. cariosa corticata* Wain., but he asserts that *C. symphyicarpha* Ach. as interpreted by Floerke in herb. and illustrated in Arnolds Icones No. 1485, to be *C. alpicola* v. *Karelica* Wain., and *C. symphyicarpha* Fr. as published in the Friesian exsiccati is given a similar identity. If Wainio’s reference is warranted and it is desired to know just what constitutes *C. symphyicarpha* Fr., through the lack of any adequate diagnosis his description in the Monograph must be accepted. The following is an abbreviated rendering:

C. alpicola (Flot.) Wain. var. *Karelica* Wain.

Thallus persistent or subpersistent, of scattered or crowded medium sized (2-4 x 1-3 mm.) olivaceous squamules, the margins irregularly incised or incised-crenate; podetia 4-10 mm. in height, aggregated or solitary, suberect, ascyphiferous, subcylindrical or club-shaped, simple or sparsely furcate-divided, laterally entire or at length slightly fissured or sulcate, cortex sub-continuous or partly or wholly verrucose-areolate, the areola contiguous, esorediate and esquamulose, opaque or faintly shining, olivaceo-glaucous or olivaceo-fuscescent; apothecia terminal, medium or large, confluent or conglomerate, convex immarginate and brown. KHO—

A comparison of the foregoing description with that of Tuckerman’s Synopsis for *C. symphyicarpha* Fr. will show very clearly, that if Tuckerman had in mind the plant of Wainio, he diagnosed it most imperfectly. Indeed it seems certain that his conception of *C. symphyicarpha* comprehended a greater degree of variability for the species than is conceded by others, or else granted relationship to it forms of much unlikeness. One of the numbers in the plate accompanying this note illustrates what Tuckerman calls the “macrophylline state” of *C. symphyicarpha* and portrays a plant differing in many particulars from *C. alpicola Karelica*. The earliest collected specimens of *C. symphyicarpha* contained in the Tuckerman herbarium is credited to Ravenel, Santee Canal, S. C., 1864. The reaction

for this specimen (and by the way it belongs with the "macrophylline" condition), as recorded by Tuckerman on the mount is "K viridescens." Another example from Beaufort, S. C., J. H. Mellichamp, 1868, (the subject of our illustration) affords "K. virescit dein fusca." From either of these specimens and particularly the Beaufort one, no reason is found to separate plants received from Prof. H. A. Green, of Tryon, N. C., and Mr. C. C. Plitt, of Baltimore, Md. Careful examination of this so-called state of *C. symphy-carpa* and comparison with examples of *C. alpicola Karellica*, and *C. sub-cariosa* leads the writer to a conviction of its specific distinctness. In general configuration and habit it is much nearer *C. subcariosa* than *C. alpicola Karellica*, but it may be easily distinguished from the former by a difference in reaction and of the cortical characters, and from the latter by dissimilarity in stature and the dimensions of the thalline squamules. The following is a description of the plant, for which the new name is proposed:

Cladonia polycarpia n. sp.

Thallus persistent, of contiguous or dispersed medium or large (—15mm.) rounded irregular or oblong greenish-glaucous squamules, the margins incised-lobulate or crenate or irregularly sinuous; podetia —25mm. in height, aggregated or solitary, erect or decurved, the younger conditions club-shaped subcylindrical and terminated by a single apothecia, older states cylindrical or compressed, with abrupt dilated short-divided summits, an apothecia solitary on each branchlet, or when the divisions are not apparent the apothecia confluent, the podetia laterally entire or fissured, cortex sub-continuous or areolate, the areola contiguous or discrete or more or less confusedly rugulose, esorediate but rarely and sparsely sub-squamulose, opaque, greenish-glaucous; apothecia yellowish-flesh-colored, rufescent, fuscous or dark brown. KHO—

Taken in connection with the description of *C. subcariosa* given by Dr. Fink in BRYOLOGIST IX, No. 4, the definitions herein given of *C. alpicola Karellica* and *C. polycarpia* will furnish a satisfactory guide to any enquirer into the *C. symphy-carpa* muddle. With regard to *C. alpicola Karellica* Wain. in point of place in our flora nothing definite can be stated. It is cited in many local lists under its synonym of *C. symphy-carpa* Fr. but it is manifestly impossible to ascertain whether the short, or the "macrophylline" state of Tuckerman's diagnosis is understood. In the writer's opinion the plant mentioned in Dr. Fink's paper, BRYOLOGIST IX, No. 2, under the name of *C. cariosa corticata* Wain. collected in Knox Co., Maine, belongs with the species. It is well comparable with the description, the reaction is unlike that of *C. cariosa* being KHO—, while in stature and habit it strongly resembles No. 1485 of Arnold's Icones, likewise KHO—, according to that author. The writer is also in receipt of a similar plant from Central Village, Conn. Collected by J. L. Sheldon, that is similarly referred.

Rockland, Maine.

METHOD OF MAKING PHOTO-MICROGRAPHS OF MOSSES AND HEPATICS.

WILLIAM B. DAVIS.

(Abstract of Talk given at Sullivant Moss Society Meeting, Baltimore, 1908.)

To the uninitiated photo-micrography seems to belong to the realms of mystery and difficulty. It is safe to assume that the majority of bryologists are amateur photographers, and use a compound microscope in their work. The reason that this form of work is not more common arises no doubt from fancied rather than real obstacles. The paraphernalia and manipulation required are both simple and easy. While it is not given to all of us to have sufficient artistic ability to produce creditable reproductions of what we see, yet the poorest sort of a carpenter can build the necessary outfit for this work. Again some of our drawings are apt to be colored with what we think we see. Given a fairly transparent section or mount (as most preparations of the mosses and hepatics are), a coal-oil lamp, compound microscope, and plate camera, we can at least have the experience of something novel. Nor is the possession of a suitable camera a *sine qua non*. Obtain a plate holder and build your camera somewhat after the plan of the man who carried the bung-hole to the cooper's shop to have a barrel made for it. The camera lens is not used in this work.

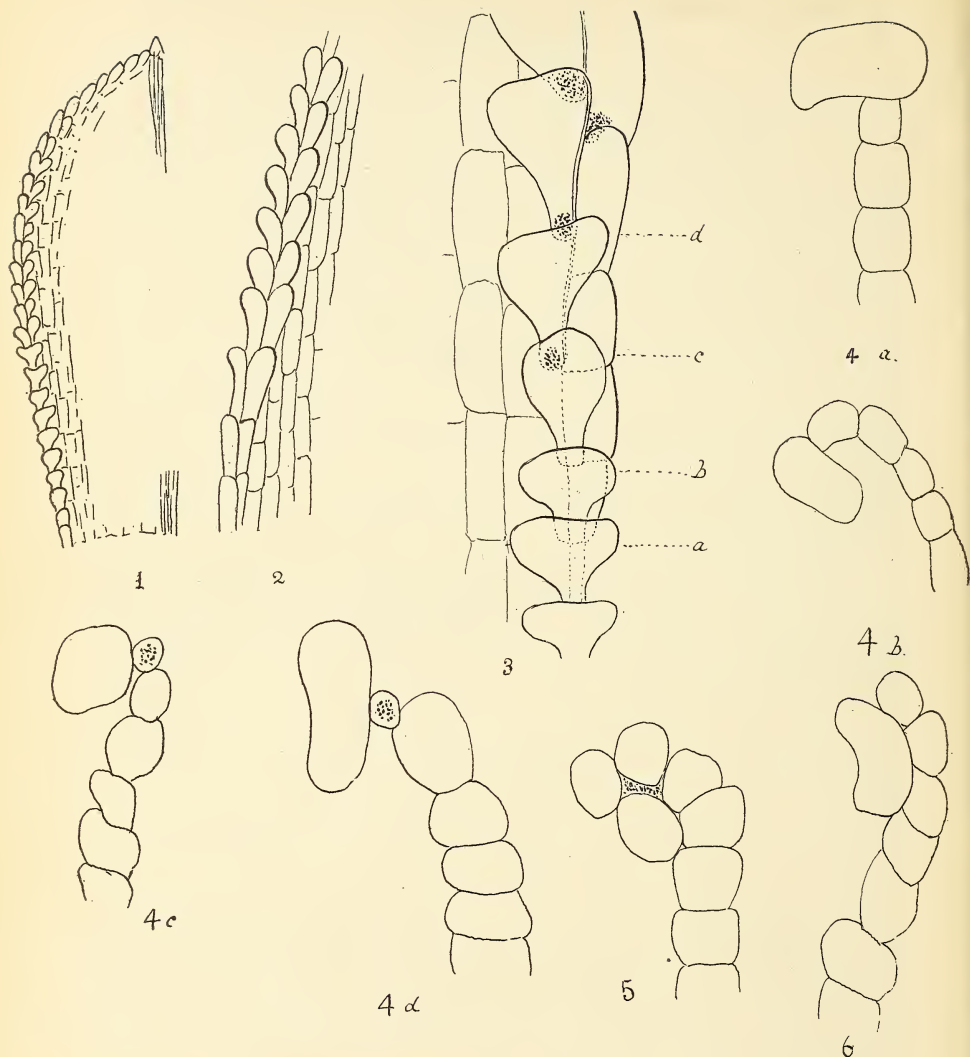
Take a small wooden box, or glue one together from stiff cardboard; blacken it on the inside; cut a hole in the front, and through the hole push a cone shaped like a megaphone. The architects' ingenuity will suggest a way to hold the ground glass and plate holder at the other end. Make the box perfectly light tight.

To take the photograph bend the microscope over to a horizontal position. Lower or raise the lamp on some books with lamp in front of the microscope, edge of flame towards the microscope and in line with the optic axis; swing the mirror out of the way; place the object (transparent of course) under the spring clips. Have the camera box on a level with the microscope and push the small end of the cone over the tube of the microscope, the eye piece remaining on, if the home made affair is used.

If using a plate camera, remove the lens and push the tube into the camera. By focusing, the clear image of the object will be seen on the ground glass. Some folds of dark cloth should be wrapped about the tube where inserted into the camera in order to keep out all light. After the sharp image has been obtained, care must be exercised by pressing firmly with one hand to make sure that the apparatus is not disturbed while inserting the plate holder.

Exposure by lamp light will require considerable time, perhaps some minutes, and experience at this stage will be the best guide. Opaque objects can be best photographed by using ordinary daylight.

Philadelphia, Pa.



Del. H. N. Dixon. Drawing reduced $\frac{1}{4}$.

EXPLANATION OF PLATE V.

1. Margin of bract, $\times 25$. 2. Portion of margin, $\times 80$. 3. Margin towards base of bract, $\times 160$. 4, 5, 6, do., in transverse section, $\times 160$. [N. B. Fig. 1 shows the bract viewed from the back; Figs. 2-6 show marginal view, with ventral surface of bract to right, dorsal surface to left.]

A REMARKABLE FORM OF FUNARIA HYGROMETRICA.

H. N. DIXON, M.A., F.L.S.

Cases of teratology in mosses do not seem common, and as far as they have come under my notice they appear usually to belong to the sporophyte. In the oophytic generation I have a leaf of *Campylopus* which is forked, nerve and all, for half its length, and in *Barbula convoluta* var. *Sardoa* I have frequently found the hyaline apical cell bifid or double. These appear to be cases of pure teratology of a more or less pathological kind. The structure which I am about to describe while equally abnormal is totally different in its nature, and possibly functional rather than pathological.

Among some material of *Physcomitrella patens* sent me by Mr. Evans for examination, collected on half dried mud at the upper end of Tonduff Reservoir, in the Pentland Hills of Midlothian, by Mr. W. E. Evans, in Oct., 1908, was a taller Funarioid moss which on examination proved to be the ♂ plant of *Funaria hygrometrica*. The antheridia were approximately mature, and the lateral ♀ shoot was just beginning to be developed from the axil of a lower leaf.* The plants were normal so far as I could ascertain, with the exception of the margins of the perigonal bracts, which exhibited a remarkable, and in all the material sent a constant structure.

The bract of the ♂ flower in *F. hygrometrica* so far as I am aware presents normally the same variation in marginal denticulation as that of the ordinary foliage leaves, i. e., they are usually moderately denticulate at the apex, ranging from quite entire to distinctly toothed. Thus most systematic works simply describe them as "denticulate at apex," and they are so figured in the Bry. Europæ. Wilson (Bry. Britannica) describes them as "denticulate at the apex, and still more evidently so at the base;" and this is the only description I have found in which anything like an approach is hinted at to the peculiar structure of the bracts of the Tonduff plant, and certainly does not represent the usual condition of the bracts in *F. hygrometrica*, which are generally entire or nearly so in the lower half.

In the Tonduff plant the ♂ bracts presented a very striking appearance, the margins throughout almost their whole length being furnished with closely set and often double serratures, forming a very remarkable and pretty fringe or frill (cf. Fig. 1). The structure was best marked on the two or three innermost bracts, but was present in a less marked degree on the succeeding ones, the outermost only, like the stem leaves, being of the normal character, entire, or only slightly toothed towards apex. At first sight the serratures reminded one of the double row of teeth in *Catharinea* or in the Bi-serratæ section of *Mnium*, only with the teeth much more obtuse (cf. Fig. 2); closer examination however showed the resemblance to be illusive, the structure being quite different and more complex. The twin teeth in *Catharinea* and *Mnium* spring from two adjacent cells of the thickened limb or border, and could scarcely, it may be presumed, be developed from a unistratose border. In the *Funaria* the effect is in part produced by a row of turgid marginal cells, each spreading out from a narrow base into a sort of hammer-

*Cf. Boodle, Annals of Botany, Vol. XX, No. LXXIX, July, 1906.

head apex, frequently semilunar above (comparable in form to the section of the apical cell of lamellæ in *Polytrichum commune*, but usually asymmetrical); (cf. Fig. 3a.) These cells are connected with the adjoining cells of the next row by only a very narrow attachment, the greater part of their surface being free; they are frequently almost without chlorophyll grains above, with a dense mass of chlorophyll collected at the extreme base or proximal end.

In addition to this marginal row of cells, the succeeding rows (cf. Figs. 1, 2), are also frequently extremely turgid, clavate, and so strongly protuberant at the upper or distal end as to be free from contact with the adjacent cells except by a very small proportion of their surface. The structure is further complicated by the recurving of the margin, which varies greatly in extent in different bracts and in different parts of the same bract. When the margin is erect, which is usually the case near the base of the leaf, the appearance is as at Fig. 3a; higher up the bract, as it gradually recurves, the ventral surface of the protuberant subjacent cells comes more and more into view, as at Fig. 3c, d; and when this protuberance becomes strongly marked and these adjacent cells are almost free at their apex the appearance shown in Figs. 1, 2, is caused, giving the appearance of a double frill to the bracts. This may be still further enhanced by the margin becoming more strongly recurved, and by several rows of subjacent cells exhibiting turgescence and protuberance, though it is never so markedly presented by these as by the first and second marginal rows.

This structure is somewhat elucidated by cutting transverse sections of the bract. Figs. 4, 5, 6 illustrate various points on different bracts, with differing degrees of recurving of the margin. The letters a, b, c, d, in Fig. 4, correspond to the positions of the equivalent lettering in Fig. 3, the sections being taken at these points (or at least at corresponding points, since the sections were not all actually made from the same bract).

Figs. 5, 6, show the remarkable degree of recurving sometimes attained, so that the marginal cell is at times in close contact with three or even more rows of cells, and appears to be and probably is adherent to their cell-walls, as is often the case in species of *Grimmia* and *Barbula*, where the closely recurved margin of the lower part of the leaf gradually becomes transformed into the bi-stratose thickened margin of the apical part.

The question naturally arises as to what is the genesis of this remarkable, perhaps unique formation. Is it an adaptation to a special environment, or a reversion to an ancestral type, or is it a merely fortuitous sport due to abnormal conditions of growth? I am not able to give any satisfactory reply; I can only suggest one or two ideas which have occurred to me, and perhaps some reader will be able to frame an explanation.

There can be but little doubt that the primary end attained by this abnormal cell development is the storage of an increased quantity of water or at any rate moisture, an end attained to some extent also by the capillary attraction of the recurved margin. The resemblance of some of the turgid marginal cells to the "flask-cells" of the cortical stem-layer in *Sphagna*, e.g. *S. molluscum*, at once strikes the eye, and the group of cells looked upon

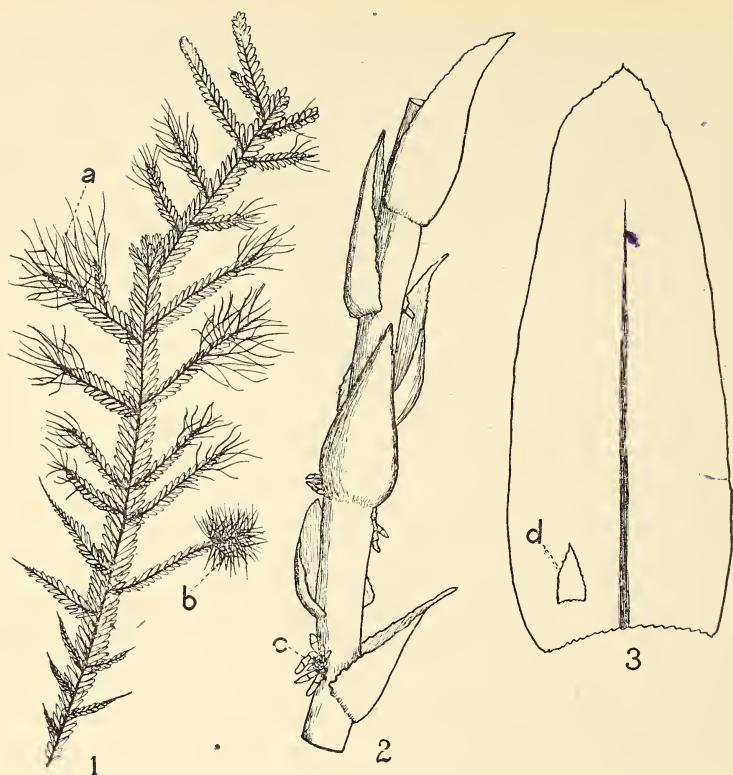
as storage cells for water at the base of some *Sphagnum* leaves provides a further analogy. Another point that attracts the attention in examining a flower of the Tonduff plant is the close resemblance between the turgid marginal cells nearest the base of the bract (*e. g.* b, Fig. 3) and the uppermost cell of the swollen clavate paraphyses; so much so that I have frequently been in doubt whether I was looking at one or the other. This turgescence of the apical cell of the paraphyses of the ♂ flower is characteristic of certain large groups of mosses, and will be found usually correlated with a dioicous or autoicous inflorescence, large discrid ♂ flowers, and lax areolation. It obtains, for instance, almost throughout the *Splachnaceae*, *Funariaceae* and *Mniaceae*; and its special correlation with the male organs is manifested by the fact that not only are the ♀ paraphyses in these cases almost without exception filiform, but even in certain synoicous species, *e. g.* of *Mnium*, the paraphyses surrounding the antheridia are markedly clavate, while those in proximity to the archegonia are of the more usual, filiform shape.

The paraphyses in these cases act, no doubt, as reservoirs for keeping the antheridia properly moistened. The antherozoids, in exact contrast with the spores of the mature capsule, require conditions of moisture to perform their proper functions. They are in fact aquatic organisms, and their constancy in this respect throughout whole groups of the Cryptogamia suggests that this feature is an inherited character retained ever since the emergence of their primeval algoid ancestor from its aquatic home to find a new environment on *terra firma*. May we pre-suppose a primitive ancestral *Funaria* with its sporophyte already well developed, but with the vegetative organs as yet confined to the protonema with its algoid structure, as in the remarkable *Ephemeropsis Tjibodensis* of Java; having its antheridia surrounded by water reservoirs in the shape of turgid paraphyses, possibly also with turgid end-cells to the branches of the protonema, the "Assimilations-organen" of the *Ephemeropsis*? And may we see in these paraphyses, or in this protonemoid development, the beginning of the structure afterwards to be evolved into the foliar organs, commencing with the bracts surrounding the antheridia? In this case the marginal cells of the newly evolved foliar structure would probably be turgid as in the bracts of the Tonduff *Funaria*, and it would only be in the later stages, as the foliar organs developed a greater expanse of lamina, that these special reservoir cells would be dispensed with, and the margin take the normal, simple structure of the rest of the leaf. If so we might possibly see in the bracts of the Tonduff plant a reversion to a type midway between the organs of the supposititious ancestral leafless plant and those of the present normal *F. hygrometrica*.

Whatever be the explanation of the structure, it would appear from Wilson's description quoted above that there is a certain plasticity about the male bracts in this species, as regards the serrature of their margins, and the student would do well to keep an eye on them with a view to throwing further light on the problem involved.

I have to express my thanks to Mr. L. A. Boodle, of the Jodrell Laboratory, Kew, for assistance and suggestions.

Northampton, England.



Del. T. C. Frye

PLATE VI. Fig. 1. Plant $\times 1$. Fig. 2. Stoloniform branch $\times 75$.
Fig. 3. Leaf $\times 15$. Magnifications after drawing was reduced $\frac{1}{2}$.

PECULIARITY IN *NECKERA MENZIESII*.

THEODORE C. FRYE.

Neckera Menziesii is one of the very common mosses on tree trunks and horizontal branches in Washington. It is particularly abundant on *Acer macrophyllum*, the large-leaved maple; whose trunks are sometimes covered with a dense mat as much as six inches thick. The lower green branches frequently become stoloniform at the tip like those at the base of Fig. 1. However, in February, 1909, the writer found near Seattle, Wash., a tree over part of which the stoloniferous branches had become densely branched, resembling even the "Witch's Brooms" sometimes found on junipers, hemlocks, etc. (Fig. 1, a, b). This form is very rare in Washington, for the writer has found it but this once.

The leaves on the stoloniform branches are very small as shown in Fig. 3 in which such a leaf (d) is compared with a normal one. These small leaves are also veinless and have a more triangular form. The leaves are relatively far apart as shown in Fig. 2, in which *c* are paraphyllia.

It is surmised that the branches serve as a means of vegetative propagation, since they are easily shaken off in broken pieces, and were found in a very fine habitat for this species. The peculiar form is not a product of a peculiar season, since the old dead basal parts of the plants, certainly several years old, show some of these stoloniform branches still attached. *Eurhynchium stoloniferum* grows attenuated when pendent and such forms have been described as *Eurhynchium substoloniferum*. *Antitrichia curtipendula* sometimes gets stoloniform when pendent; but *Neckera Menziesii* being unusually pendent, could not have these branches due to the position. The great difference between the normal and the abnormal branches suggests at once a different function for the latter. If there is any physical reason for their formation it does not seem to be known.

University of Washington, Seattle, Wash.

SPORE DISPERSAL OF SPHAGNUM.

The interesting observations of Mr. E. J. Winslow upon this subject in a previous number of THE BRYOLOGIST (X:III. 1907) may be supplemented by a reference to Nawaschin Flora 83. 151, ff. with Pl. IV. 1897. (not 1867 as Warnstorf gives it in Kryptogamenflora der Mark Brandenburg I, 313). Roth (Die europäischen Torfmoose, 1906) omits in his bibliography any mention of this very important article. The phenomenon of the explosive discharge of the spores of sphagnum has long been known to European bryologists. Nawaschin's careful observations and experiments demonstrate the correctness of an hypothesis of Schimper that compressed air within the capsule is the cause of the explosion. The air within the capsule occupying the place of the columella which is shrivelled up when the capsule reaches full maturity is compressed through a shrinking of the walls of the capsule caused by drying. This shrinkage affects only the transverse diameter of the capsule, the longitudinal one remaining constant. The normally globose capsule becomes then under the effect of dryness cylindrical, quite like a cartridge as Nawaschin puts it, the spores occupying the position of the shot, the compressed air that of the powder, the operculum corresponding to the outer wad, the membrane of the spore-sac to the inner one. The operculum is composed of a stiff and unyielding membrane and the result of the contraction of the capsule-walls is eventually the bursting of the membrane connecting them with the operculum, thereby effecting the discharge of the cartridge. It should be added that the capsule-walls in sphagnum have only apparently functionless pseudo-stomata, so that the compressed air has no means of escape except the very slow one of diffusion through the tissues themselves. Nawaschin was able to compute the pressure of the compressed air in the dry capsule as equal to from three to five atmospheres. This sphagnal air-gun appears to be "without a parallel among the mosses, if not in the whole vegetable kingdom."

A. LE ROY ANDREWS.

Ithaca, N. Y.

NOTES ON NORTH CAROLINA BRYOPHYTES.

A. J. GROUT.

A few hepatics were collected during my summer at the Pink Beds, in 1907, but a long delay in identifying them has prevented previous publication. These listed below were gathered incidentally to the collection of mosses. See THE BRYOLOGIST, XI: March, 1908.

1. *Bazzania triangularis* (Schleich.) Lindb. On moist rocks, near Green Knob, alt. 5000 feet.
2. *Calyptogeia Trichomanis* (L.) Corda. Same habitat as last species.
3. *Cephalozia curvifolia* (Dicks.) Dumort. On summit of Chestnut Bald, alt. about 6000 feet.
4. *Diplophyllia apiculata* Evans. Collected with No. 1.
5. *Frullania Asagrayana* Mont. On bark of young balsams, on summit of Chestnut Bald.
6. *Frullania Eboracensis* Gottsche. On summit of Chestnut Bald.
7. *Geocalyx graveolens* (Schrad.) Nees. Collected with No. 3.
8. *Herberta adunca* S. F. Gray. On bark of trees in the mountains.
9. *Lepidozia sylvatica* Evans. Collected with No. 2.
10. *Lophozia gracilis* (Schliech.) Steph. Collected with No. 3.
11. *Marchantia polymorpha* L. In the Pink Beds.
12. *Metzgeria conjugata* Lindb. On Chestnut Bald.
13. *Odontoschisma denudatum* (Mart.) Dumort. Near summit of Green Knob.
14. *Pellia epiphylla* (L.) Corda. Locality not noted.
15. *Plagiochila Sullivantii* Gottsche. Collected with No. 5. Stunted or very immature.
16. *Porella platyphylla* (L.) Lindb. Collected with No. 3.
17. *Riccardia* sp. Cool spring under rocks, in Pink Beds, alt. 3300 feet.
18. *Scapania* sp. Fragments, on bare cliffs on summit of Chestnut Bald.
19. *Scapania nemorosa* (L.) Dumort. Common.
20. *Sphenolobus exsectus* (Schmid.) Steph. Collected with No. 3.
21. *Trichocolea tomentella* (Ehrh.) Dumort. Locality not noted.

On a moss-coated, stunted yellow birch on the top of Chestnut Bald the following species of mosses and hepatics were collected: *Dicranum fulvum*, *D. longifolium*, *Ulota crispa*, *Zygodon excelsus*, *Brachythecium oxycodon* forma, *Entodon brevisetus*, *Homalotheciella subcapillata*, *Pylaisia subdenticulata*, *P. intricata*, *Raphidostegium recurvans* forma *flagellata*, *Neckera pennata*, *Frullania Asagrayana*, *F. Eboracensis*, *Metzgeria conjugata*, *Porella platyphylla*. New Dorp, New York.

SEQUENCE OF MOSS GROWTHS.

[The following letter received March 27, was not intended for publication, but it seems to be of sufficient interest as calling attention to phenomena possibly noticed by others in different sections of the country. Mr. Hill wrote in a previous letter "The past season has been a very poor one for

moss hunters, indeed for several seasons the moss flora seems to have almost entirely failed, at least as far as fruiting is concerned. These cycles are puzzling, and they appear to hold with several, possibly all departments of our botany. In 1904 the *Agarics* were in wonderful profusion and variety, and I added about 150 varieties to my collection, this year not one.”]

DEAR MRS. SMITH;

At the risk of appearing obtuse and of broaching a subject trite to careful observers, permit me to call your attention, and that of Members of the Society, to a few facts with regard to alternation of moss growth that have forced themselves upon my notice during the years in which I have taken an interest in bryological study. Your attention has already been called to the fact that only a small percentage of the seasons yields what may be called a full exhibition of the Moss flora of this coast, but an additional peculiarity is noticeable in the fact that alternate years exhibit an entirely changed facies in the products of the same locality.

For instance, 1904 was a most prolific season in our moss flora and the *Mniums*, in their several varieties, being among the most abundant of our genera, were in evidence everywhere and while the smaller varieties were not wanting, *Mnium insigne* was very greatly in the ascendant, covering large spaces with dense and luxuriant growth in finest fruitage. Such patches could not fail to catch the eye of the collector and to be permanently located by him; but fancy the surprise when the next season not a single plant of *M. insigne* was to be found, but in its place, in every instance, the smaller varieties were invariably substituted.

It would be interesting to know if other students have observed a like phenomenon.

A somewhat similar case is now in evidence on an old and neglected lawn in this vicinity. The soil is slightly damp and last year was covered with a dense, matted growth of minute and sterile *Mniums*, whereas this season it is as densely covered with well developed *Hylocomium triquetrum*, also sterile, and not a *Mnium* of any variety is to be seen. It is a patent fact that not a plant of either of these mosses occurs within considerable distances of this old lawn and as *H. triquetrum* is well known to be an exceedingly rare fruiter, it is a matter of wonder how these startling alternations of genera and species can occur.

Another peculiar fact presents itself in the case of *Funaria hygrometrica* which never fails to appear in densest growth wherever, in damp situations, the soil has been recently and thoroughly burned.

One may be prepared to attribute the phenomenon to abio-genesis but if not to what source can we trace it?

The same peculiarity is noticeable in forest growth. While not so much in evidence on this coast where practically all our forests are evergreen without any alternation, it is an invariable rule in our Eastern Provinces that the destruction of an evergreen forest is immediately succeeded by a deciduous growth and vice versa. It is not unusual to see the site of a former fir forest, which has been thoroughly burned, spring up within a year

to a dense growth of black cherry or silver birch where no one would suspect that a cherry pit could have survived the conflagration much less the fragile seed of the birch. Then where did this multitude of cherry pits come from, when to a certainty no cherry tree had existed in the vicinity for a century at least, and how could they in any event have escaped destruction in such a furnace as that to which they were necessarily subjected!

The subject I know has been thrashed out from Aristotle to Huxley without reaching a satisfactory solution. Can any of our members advance a theory that will aid in solving the problem?

Very sincerely yours,

ALBERT J. HILL.

REVIEW—THE BRYOPHYTES OF CONNECTICUT.

By ALEXANDER W. EVANS and GEORGE E. NICHOLS, State Geological and Natural History Survey, Bulletin No. II.

It would be difficult to overestimate the value of this contribution to Bryology. Not only is it a perfect model of what such a work should be, but its comprehensiveness makes it so nearly a manual that it will be of great service to students. Dr. Grout having already reviewed the work¹ it is merely my intention to dwell upon some parts of it, that is the first three orders comprising the hepatics: the Marchantiales, the Jungermanniales, the Anthocerotales. The dozen pages filled with the general characteristics of the Bryophytes and the general characteristics of these three groups are of utmost value to students. I hope many will obtain this Report² and study these pages. There is a fine chapter devoted to the distribution of the Bryophytes in the State according to environment to which I also call the student's attention. This is followed by another chapter on their economic value and then comes the catalogue in which the one hundred and seven species of hepatics fill thirty-eight of the one hundred and thirty-nine pages and give us the last word in nomenclature.

Dr. Howe in his review of the Report in *Torreya*³ says: "*The Bryophytes of Connecticut* will prove almost as useful in New York and indeed along the whole North Atlantic seaboard as it will in Connecticut."

CAROLINE COVENTRY HAYNES.

SULLIVANT MOSS SOCIETY NOTES.

Sullivant Moss Society Members and Students of the Hepatics.

Dr. George H. Conklin, 1204 Tower Ave., Superior, Wisconsin, will now take charge of our Herbarium and look after the varied interests of the Hepatic Department. Specimens and inquiries may be addressed to him. I am sincere in saying that I regret to be obliged to give up, temporarily, this work. It has been such a pleasure to see it grow; the herbarium, for one thing, is eleven times larger, and it is good to know of the keen interest of a number of the members. There are already long lists of species from several

1. THE BRYOLOGIST, Vol. XII: 2, 1909.

2 No. II, thirty cents, George S. Godard, State Librarian, Hartford, Conn.

3. *Torreya* Vol. IX: 2, 1909.

States and I hope we shall all work to have *all* the States fully represented. Valuable data of distribution, etc., will then be available for those contemplating listing species. The impetus given to this kind of work by the publication of "The Bryophytes of Connecticut," will be productive, I am sure, of similar, much needed contributions. Being now at the Highlands, I am finishing the determinations of sets that I began to study last autumn, and will report upon them as soon as possible. Of course I shall be glad to hear from any of the members, I shall have more time for this and also for other work that I am doing. Let me add that I consider the Society fortunate in getting Dr. Conklin to carry on the work.

CAROLINE COVENTRY HAYNES.

New Members—No. 193. Miss Gertrude Streator, Clark Hall, University Station, Seattle, Wash.

Please note change of address for Mr. Walter Gerritson, to 37 Washington Avenue, Waltham, Mass.

Our attention has been called to a most desirable microscopic accessory for the mounting of opaque objects. Anyone interested may obtain further information and a sample slide, by addressing Mr. W. H. Van Sickle, 2618 North 33d street, Philadelphia, Pa.

Miss Caroline Coventry Haynes desires to call especial attention to the following items, first in connection with the gift, by Dr. I. Hagen, of a fine collection of Scandinavian Hepatics, to the Sullivant Moss Society, which through an error was not credited to him in her Annual Report. We hope he will accept apologies and hearty thanks for the valuable set.

Attention is also called to the series of Canadian Mosses that Prof. John Macoun, whose genius for collecting is so well known, is issuing. There are to be five hundred in all, three hundred having been issued. They cost eight dollars a hundred. Now is the time to become subscribers before all sets are taken. Address Sussex St., Ontario, Canada.

There are several of our Society members living in remote places away from Herbaria, who would be glad to have specimens of Mosses, Hepatics and Lichens. If those having even a few to contribute will send them to Mrs. Josephine D. Lowe, 2622 Woodly Place, Washington, D. C., she will see that proper distribution is made. Send *all* you can spare and *at once*.

Mr. R. Heber Howe, Jr., offers Parts I and II, Tuckerman's Synopsis of North American Lichens, 1882, complete for \$25.00. Splendid brand new copies.

OFFERINGS.

(To Society Members only. For postage.)

Dr. J. F. Brenckle, Kulm, North Dakota, wishes to call attention to the following correction of determination for two mosses sent out by him in the offerings for March, 1908. No. 1470 should be *Thuidium minutulum* (Hedw.) B. & S., instead of *T. microphyllum* as named. No. 1500 is nearest to *Catharinea angustata* Brid. and not *C. undulata* as named.

- Mr. Reginald Heber Howe, Jr., calls attention to a slip in proof reading in his offering in the March, 1909 number. It should be *Usnea longissima* Ach. and not *U. Virginiana* as given.
- Mr. Edward B. Chamberlain, 38 West 59th street, New York City. *Eurhynchium speciosum* Schimp. cfr. and *Thuidium hystricosum* Mitt. st. Collected by Mr. W. E. Nicholson, Sussex, England.
- Mr. C. C. Kingman, 11 Woburn street, Reading, Mass. *Sphagnum fimbriatum* Wils. and *S. Torreyanum* Sulliv. Collected in eastern Massachusetts.
- Mr. N. L. T. Nelson, 4509a Cote Brilliante Avenue, St. Louis, Missouri. *Barbula caespitosa* Schwaegr. cfr. Collected in Missouri; *Bartramia Oederi* Schwaegr. cfr. Collected in Minnesota.
- Mrs. B. J. Handy, 137 Rock street, Fall River, Mass. *Hypnum Haldanianum* Grev. cfr.; *Sematophyllum recurvans* (Rich.) E. G. Britton cfr.; *Thuidium paludosum* (Sulliv.) Rau & Herv.; *T. delicatulum* (L.) Mitt. Collected in Fall River, Mass.
- Mr. C. C. Plitt, 3933 Lowndes Avenue, Baltimore, Maryland. *Cladonia verticillata evoluta* Th. Fr. Collected in Maryland.
- Prof. Thomas A. Bonser, Spokane College, Spokane, Wash. *Grimmia montana* B. & S., *Cladonia decorticata* Floerk. Collected in Washington.
- Rev. H. Dupret, Seminary of Philosophy, Montreal, Canada. *Thuidium Blandovii* B. & S., and *Timmia megalopolitana* Hedw. Collected in Montreal.
- Mr. A. S. Foster, Aberdeen, Wash. *Frullania Nisquallense* Sulliv.; *F. franciscana* Marshall A. Howe. *Cephaloziella divaricata* (Sm.) Schiffn. Collected in Washington.
- Mr. W. W. Calkins, Berwyn, Cook Co., Illinois. *Verrucaria nigrescens* Pers., *Polytrichum commune* v. *uliginosum* Heubn.; *P. Ohioense* Ren. & Card. Collected in Cook County.
- Dr. George H. Conklin, 1204 Tower Ave., Superior, Wisconsin. *Cephalozia curvifolia* (Dicks.) Dumort. *Lepidozia reptans* (L.) Dumort. *Jameconiella autumnalis* (DC) Steph. *Porella platyphylla* (L.) Lindb.

We call attention to a new publication, "Mycologia," edited by Dr. Wm. A. Murrill, and published by the New York Botanical Garden, in continuation of the "Journal of Mycology" which was suspended at the death of Prof. W. A. Kellerman. Mycologia will have a department of Lichens, the first number (January) containing an article by Prof. Bruce Fink on the Problems of North American Lichenology.



JULY 1909



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICAS AND LICHENS

FOUNDED IN 1898
By
ABEL JOEL GROUT, Ph.D.

EDITOR
ANNIE MORRILL SMITH

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Mr. George Alexander Wheelock explaining his interpretation of the clay beds at Keene, N. H., Oct., 1899. Photograph taken by Mr. M. L. W. Field.

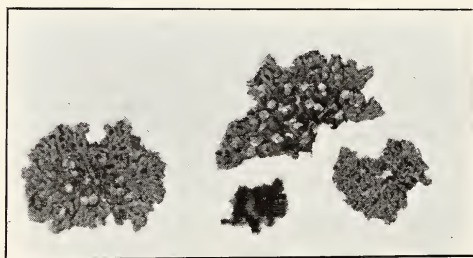


PLATE VIII. *Physcia caesia* (Hoffm.) Nyl.



Mr. George Alexander Wheelock explaining his interpretation of the clay beds at Keene, N. H., Oct., 1899. Photograph taken by Mr. M. L. W. Field.

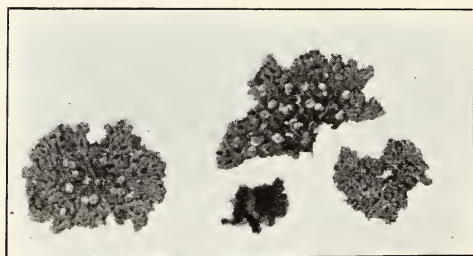


PLATE VIII. *Physcia caesia* (Hoffm.) Nyl.

THE BRYOLOGIST

VOL. XII

JULY 1909

No. 4

LICHENS OF THE MOUNT MONADNOCK REGIONS, N. H. No. 4.

(See BRYOLOGIST, XI, March and July, 1908, XII, March, 1909.)

BY R. HEBER HOWE, Jr.

GENUS: PHYSCIA (DC., FR.) TH. FR.

54. PHYSCIA SPECIOSA (Wulf., Ach.) Nyl. Five specimens thus labelled belong here. Three specimens first labelled "*Parmelia tribacia*," and later corrected, also belong here. One fruited specimen, first labelled "*Physcia caesia* v. *Stellata*," later corrected to "*speciosa*" is *P. tribacia*.
55. PHYSCIA HYPOLEUCA (Muhl.) Tuck. Four fertile specimen thus labelled all belong here.
56. PHYSCIA AQUILA DETONSA Tuck. Two specimens, one fertile, labelled thus, belong here. Also two specimens labelled "*aquila*," one fertile specimen labelled "*Physcia ciliaris*," one fertile specimen first labelled "*P. crinita*," but corrected to this, and two fertile unlabelled specimens. (Fitzwilliam, common).
57. PHYSCIA PULVERULENTA (Schreb.) Nyl. Three fertile specimens, thus labelled. Also one fertile specimen labelled "*Physcia aquila detorsa*," one fertile unlabelled specimen, and one sterile specimen labelled "*Par. saxatilis* v. *omphalodes*," in which the cortical layer is distinctly parenchymatous is referable to the following:
58. PHYSCIA PULVERULENTA LEUCOLEIPTES Tuck. One sterile specimen labelled thus belongs here. Five specimens, one labelled "*P. pulverulenta*," one "*Physcia ulothrix*," and one "*Physcia aquila*" appear to belong here, but are too small for sure determination. Also one specimen, sterile, first labelled "*Parmelia saxatilis omphalodes*," but changed to "*Pyxine*." (Fitzwilliam, uncommon). *Physcia Leana* Tuck. One fertile specimen, thus labelled, seems to belong here though I have been unable to obtain specimens for comparison.
59. PHYSCIA STELLARIS (L.) Tuck. Eight fertile specimens, labelled thus, of which two may possibly be referable to the form *aipola* Nyl: also eight fertile unlabelled specimens. One specimen labelled "*Physcia squamosa*," and one "*Physcia stellaris expansa*," later corrected to "*astroidea*," both belong here. Also one fertile specimen labelled "*Physcia obscura*." (Fitzwilliam, common).
60. PHYSCIA TRIBACIA (Ach.) Tuck. Four fertile specimens, labelled thus, belong here. One sterile specimen labelled "*Speciosa*," also three unlabelled specimens, two fertile and one sterile, and three specimens, one fertile, labelled "*Physcia caesia*," "*Physcia astroidea*," and "*Parmelia ambigua* v. *albescens*."

PHYSCIA HISPIDA (Schreb., Fr.) Tuck. Six specimens, all sterile. One is labelled "*Physcia hispida*, Nantucket," two others "*Physcia comosa*, Nantucket." There is no reason to suppose that this group of specimens came from any other locality than Nantucket.

61. PHYSCIA CÆSIA (Hoffm.) Nyl. Nine specimens, one fruited, thus labelled, belong here. One labelled "*Physcia caesia* v. *squulosa*," and two, one fertile, labelled "*Parmelia ambigua* v. *albescens*" also belong here, as well as two unlabelled specimens, one of which is doubtful on account of its small size. (Fitzwilliam—one example, first called *Physcia stellaris alpola*).

This species it seems to me should be much commoner in herbariums than it is, and perhaps this is because it is so often confused with *P. tribacia* (Ach.) Tuck., which species, if in the typical state, it does not in the least suggest. It seems, however, to me to be probably overlooked as abraded conditions of *P. stellaris*, or the rare *P. astroidea*. Without attempting to be critical I am convinced that the material distributed (judged by the specimen I received) by Mrs. C. W. Harris (BRYOLOGIST—offering of March) is *tribacia* rather than *caesia*, and the accompanying illustration of a specimen determined by Prof. Tuckerman it is hoped may help in the further determination of material by members of the Moss Society.*

62. PHYSCIA OBSCURA (Ehrh.) Nyl. Nine specimens, seven fertile, are all labelled thus, and belong here; also one fertile specimen labelled "*Physcia* v. *ulothrix*," and one unlabelled sterile specimen. (A much reduced soresdiate state is found on the stone walls at Fitzwilliam).
63. PHYSCIA OBSCURA ENDOCHRYSEA Nyl. Six fertile specimens, three unlabelled, one labelled "*Physcia erythrocardia*," one "*Physcia endocrysea*," and one "*P. obscura* v." also belong here. (Fitzwilliam, common).

64. PHYSCIA SETOSA (Ach.) Nyl. Two sterile specimens labelled thus belong here, and five unlabelled sterile specimens. One fertile unlabelled specimen also belongs here. Mounted with one of these is an undeterminable *Physcia*.

PHYSCIA ADGLUTINATA (Floerk) Nyl. Two specimens, one labelled "*P. agglutinata*" is possibly referable here, though it is unusually large lobed. Another labelled as above, is *Parmelia Borreri rudecta* Tuck.

A sterile specimen labelled "*Physcia granulifera*?" first labelled "*Pannaria lanuginosa* v. *granulosa*" appears to be *Parmelia saxatilis* (L.) Fr.

GENUS: PYPINE, FR. TUCK.

65. PYPINE-SOREDIATA Fr. Four specimens, three fertile, thus labelled, belong here. (Fitzwilliam, common). CONCORD, MASS.

TO BE CONTINUED.

* See also fine colored figure in Hoffman's Descriptio et Adumbratio Lichenes, 1790, p. 37, Tab. VIII. fig. 2 a. b.

OBITUARY—ERNEST EVERETT BOGUE. 1864-1907.

Ernest Everett Bogue was born January 13, 1864, in Orwell, Ohio. He was of French Huguenot stock on his father's side. There were nine children in the family, six of whom with the mother are still living. Mr. Bogue's early ambition was to gain a higher education, and to this end he constantly worked, earning most of the money with which to defray his expenses at school and college. He taught one term of district school; spent three years at New Lyme Institute, where he graduated in 1888, and in the fall of 1889 entered Ohio State University, from which he graduated in 1894 with the degree of Bachelor of Science in Horticulture and Forestry, and in June, 1896, he received from the same University the degree of Master of Science in Entomology and Botany.

He loved trees, plants and music, and the home surroundings and associations and education in the University all tended in the same direction.

He married on March 25, 1896, Miss Myra V. Wilcox of Columbus, Ohio, and went immediately to Oklahoma as head of the department of Botany and Entomology of the State Agricultural College, resigning in the spring of 1900, after teaching four years, to take post graduate work at Harvard University, from which institution he received the degree of Master of Arts in June, 1902. In September of that year he accepted the new chair of Forestry in Michigan Agricultural College, where his skill, originality, ingenuity and genial ways soon attracted a large class of students. He took great interest in the subject of Forestry throughout the State, visiting many of the leading farmers to encourage and help them in plans for the correct management of their wood lots, and in starting original plantations. A map of the State hung in his office well dotted with red spots showing the localities of these early efforts by farmers of Michigan. He was likewise much interested in plans to improve stump lands in the north part of the State, and in experimenting on the wild lands of the college located in the same region.

He started a forest nursery, a part of the plan of which was to furnish young trees at cost for the farmers to plant. For the beautiful home erected he selected a congenial spot near the papaw bushes, sloping to the bank of the Red Cedar, where the dam below made a delightful place for rowing for over a mile in extent. Pitcher plants, orchids and numerous wild plants of his selection occupied suitable spots between the house and river. With excellent judgment, he selected a nice variety of trees and planted about his new home, among them a fine grove of Norway Spruces, with the view of furnishing Christmas trees to the neighborhood when they should attain suitable size. The chief charm of the location, as he rightly viewed it, was just across the river on the farm, a virgin forest of maples, beeches, basswoods, elms and others delighting in such surroundings.

After a protracted illness, he died August 19, 1907, in the midst of a promising career of usefulness, as a man, as a citizen and a teacher. [Taken from 10th Report, Michigan Academy of Science, 1908, Ann Arbor].

NOTES ON NOMENCLATURE XI.

ELIZABETH G. BRITTON.

Parts 234-235 of Engler and Prantl, *Pflanzenfamilien*, was received April 16, 1909, and includes pages 1153-1246 with a reprint of pages 699-702 to replace the ones already issued. These parts conclude the mosses, give title-pages, table of contents, generic index and dates of publication and supplement. The genus *Cirriphyllum* is completed with 4 North American species and *C. Boscii* is misspelled; *Oxyrhynchium* includes one Mexican species, and *O. rusciforme* (Neck.) Warnst. *Eurhynchium* six North American species and *Bryhnia* three, *Rigodium* is represented by one species from Costa Rica, *Rhynchostegiella* by one species and *Rhynchostegium* by six.

In the appendix we find a number of additions and changes which will affect the card catalogue which we have kept at the New York Botanical Garden of the North American species of mosses; the following are noted: *Pleuridium Bakeri*; *Seligeria subcamphylopoda*; *S. patula* and var. *tristichoides*; *Dicranella substenocarpa*; *Cynodontium Treleasii*; *Dichodontium Nelsoni*; *Holomitrium Maxoni*; *Leucoloma Dussianum*; *Dicranum hispidulum*; *D. subflagellare* and *D. subulifolium*; *Fissidens arcticus*, *F. Helleri*, *F. Bushii* and *F. rochensis*; *Syrrhopodon Dussii*, *S. martinicensis* and *S. Pittieri*; *Calymperes Heribaudi* and *C. portoricense*; *Gynostomum laeve*; *Trichostomum cuspidatissimum* and *Leptodontium excelsum*.

On page 1190 Brotherus has dedicated a new genus to Mr. R. S. Williams to include a Bolivian species which has been described as *Syrrhopodon tricolor*. Only a year before a small tree of the *Rubiaceae* had been named for Mr. Williams by Elmer D. Merrill in the *Philippine Journal of Science* 3: 165, 1908. This moss may therefore very properly be called WILLIAMSIELLA TRICOLOR (nom. nov.)

Other species of the *Pottiaceae* are *Hyophila riparia*, *H. mollis* and *H. guadeloupensis*, and *Barbula Bakeri*, *B. Treleasii*, *B. rigens*, *B. andreaeoides* and *B. subandreaeoides* as well as *Phascum hyalitrichum*, *Pottia nevadensis* and *Tortula Bushii*, *T. brachypoda* and *T. macrotricha*.

Of the *Grimmiaceae*, *Glyphomitrium Leibergii* and eight species of *Grimmia* are also added; *Orthotrichaceae*, *O. sordidum*, *O. minutum* and *Ulota alaskana* are listed. Of the *Splachnaceae*, *Tetraplodon australis* and *Splachnum australe* are listed, as well as *Physcomitrum rufipes*, *Funaria spathulifolia* and *F. polaris* in the *Funarieae*. Of *Bryums* there are forty-five species added, principally from Arctic and Subarctic America. One *Mnium* and one *Meesia*, three species of *Philonotis* and one of *Polytrichum* are additions.

Of the *Pleurocarpous* mosses, two species of *Fontinalis* are added, and a number of recent changes and corrections are accepted, notably in *Erxpodium*, *Brachelyma*, *Dendropogonella*, *Dendroalsia* and *Pseudocryphaea*. *Papillaria martinicensis* and *Barbella pendula* occur within our limits, and *Tripterocladium* includes *T. Brewertianum* and *T. Howei*

according to Fleischer. In the *Entodontaceae*, *Orthothecium acuminatum* Bryhn and *O. trichophyllum* (Sw.) Fleischer are listed. I cannot agree with this last decision, for although the moss which has been known heretofore as *Lepyrodon trichophyllum* is undoubtedly not correctly placed in the genus *Lepyrodon* on account of its double peristome, it does not seem to me to belong with the *Orthotheciums*. The genus *Pilotrichum* includes six new species, *Cyclodictyon* three and *Rhynchostegiopsis* one. *Stereohyphnum* is accepted for *Microthamnium* and *Plagiothecium fallax* is added for Alaska. A list of fossil mosses is appended in which we do not find included any of the American species listed in the Bulletin of the Torrey Botanical Club 34: 139-142, pl. 9, 1907, including the two recently described species *Rhynchostegium Knowltoni* and *Glyphomitrium Cockerelleae*. The index includes families and genera only, so that unless the plan followed by us of underlining the N. A. species and indicating on the margins the sectional divisions is adopted, the student will search a weary while ere he find the species he is looking for, unless he has a card catalogue as well. We congratulate Dr. Brotherus on the completion of this work and hope that he may not be hindered with too many miscellaneous collections to name as a reward of his labors, but that he will find time to undertake the revision of some of the genera which are greatly in need of further critical study. We may not, and probably all do not, agree with some of the dispositions he has made of genera and species, nor the names he has adopted, but we are grateful to him for a modern and comprehensive treatment of a large and difficult group of plants, and we feel that such a vast undertaking could not have been better done by any one else in so short a time—1901-1909.

New York Botanical Garden.

HEPATICAE IN FICTION.

ANNIE LORENZ.

References to the Hepaticae are rare in general fiction, but the following appears in Charles Lever's "Harry Lorrequer," chapter four. (Harry Lorrequer, a rollicking young officer, is visiting at an Irish castle, and is in high favor with the ladies. They are showing him through the conservatories, and ask his opinion of some new plants.)

"Get Smith's book there," said Lady Callonby, rising, "and let me have your arm; and now, young ladies, come along, and learn something, if you can." Here her ladyship pointed to a little scrubby thing, that looked like a birch rod. I proceeded to examine it most minutely, while Collins (the head gardener) waited with all the intense anxiety of a man whose character depended on the sentence.

"Collins will have it a Jungermania," said she. "And Collins is right," said I, not trusting myself with the pronunciation of the awful word her ladyship uttered.

Collins looked ridiculously happy.

"Now that is so delightful," said Lady Callonby, as she stopped to look for another puzzle."

Smith's English Flora, to which allusion is made above, was the book in general use at that time. But while Charles Lever presumably knew as much of botany as Harry himself, he had evidently heard of Hooker's magnificent "British Jungermanniaceae," which appeared in 1816.

We are, however, at a loss to know to what species to refer the above-mentioned!

Hartford, Connecticut.

BRYOPHYTES FROM MOUNT HOOD REGION, OREGON.

A. S. FOSTER.

It may be of interest to add the following list of bryophytes collected from much the same locality as that given by Dr. T. C. Frye in THE BRYOLOGIST for January, 1909. Two trips were made, the first on Aug. 26-27, 1906, on the north side of Mount Hood, near "Cloud-Cap Inn," and the second June 18-21, 1907, on the south side near "Government Camp." The determinations were made by Prof. Holzinger, Dr. Grout, Mr. Chamberlain and Dr. Bailey.

From near Cloud-Cap Inn: MOSSES—*Dicranella falcatum pumelum* Limpr., *Hypnum ochraceum* Turn. var.?, *Grimmia Muhlenbeckii* Schimp., *Philonotis fontana* (L.) Brid., *Polytrichum gracile* Menz., *P. piliferum* Schreb., *Pseudoleskea* sp.?

HEPATICS—*Lophozia ventricosa* (Dicks.) Dum.

LICHENS—*Alectoria ochroleuca* (Ehrh.) Nyl., *A. Fremontii* Tuckerm., *A. jubata proluxa* Ach., *Cetraria ciliaris* (Ach.) Tuckerm., *Parmelia lanata* (L.) Wallr., *Umbilicaria hyperborea* Hoffm.

From near Government Camp. Mosses—*Alsia abietina* Sulliv., *Bartramia ithyphylla* Brid., *Bryum nutans* Schreb., *Camptothecium pinnatifidum* (Sulliv. & Lesq.) Jeag., *Dicranum Starkii* Web. & Mohr., *Eurhynchium strigosum* (Hoffm.) B. & S., *Fontinalis chrysophylla* Cardot, *Grimmia torquata* Grev., *G. gracilis* Schleich., *Hypnum cordifolium* Hedw. var. *fontinaloides* Lange, *Racomitrium heterostrichum* Brid., *Rhodobryum lucidum* (E. G. Britton) Frye, *Tayloria serrata* B. & S., *Neckera Menziesii* Dum.

HEPATICS—*Lophozia incisa* (Schrad.) Dum., *Marsupella emarginata* (Ehrh.) Dum, *Ptilidium Californicum* (Aust.) Underw. & Cook.

LICHENS—*Alectoria ochroleuca* (Ehrh.) Nyl., *Buellia geographica* (L.) Tuckerm., *Solorina crocea* (L.) Ach., *Stereocaulon tomentosum* Fr., *Parmelia lanata* (L.) Wallr., *Umbilicaria hyperborea* Hoffm., *Usnea barbata ceratina* Schaer.

Aberdeen, Washington.

AN ENUMERATION OF THE WASHINGTON AND OREGON
HEPATICAЕ COLLECTED BY MR. A. S. FOSTER,
1904-1909.

CAROLINE COVENTRY HAYNES.

This collection is in the Herbarium of the Sullivant Moss Society. It has given me much pleasure to determine these specimens collected by Mr. Foster at various times during the past six years. When I add that the great majority of them were found in full maturity, an idea of the value of the collection becomes evident. Thanks are due to Dr. Evans and Miss Lois Clark for verifying, and in several instances, correcting, my determinations.

Nardia obovata (Lyell) Carringt., and *Mylia anomala* (Hook.) S. F. Gray were, when collected, new to Washington.

The following species are generally found in colonies: *Radula complanata*, *R. Bolanderi*, *Scapania Bolanderi* and *Porcella navicularis*, growing indifferently on live or decayed wood and rocks. *Riccardia latifrons*, *Scapania umbrosa*, *Lophozia incisa*, *Cephalozia lunulacfolia*, *C. bicuspidata*, *Lepidozia reptans* and *Calyptogeia Trichomanis*, growing on old damp logs, shaded.

Ricciaceae.

1. RICCIOCARPUS NATANS (L.) Corda (terrestrial form).

(344) On soil among stones in protected position below Wallula Gorge, Columbia River, Wash., Feb. 25, 1906. (757) In pond near Hoquian, Wash., May 20, 1908. Det. A. S. Foster.

Marchantiaceae.

2. TARGIONIA HYPOPHYLLA L.

(343) On soil among stones, always moist but with good drainage, Stoney Butte, alt. 500 ft. (East) Portland, Oregon, April 23, 1906. (488) On humus of rocks in crevices of bluffs, Cathlamet, Wash., Feb. 10, 1907.

3. ASTERELLA GRACILIS (Web f.) Underw.

(343) On soil among rocks, Stoney Butte, alt. 500 ft. Portland, Oregon, April 23, 1906. (513) On humus of ledges, bluff below Cathlamet, Wash., March 24, 1907.

4. CONOCEPHALUM CONICUM L.

On decaying log, forest back of Cathlamet, Wash., March 16, 1907.

5. MARCHANTIA POLYMORPHA L.

On wet banks, plentiful, Hamilton, Wash., Dec. 20, 1904. (412) In boggy place, cañon back of Rainier, Oregon, May 16, 1906. (516) Floating in ponds, or on mud of margins, Cathlamet, Wash., March 24, 1907. (Common along brooks in forests west of Cascades).

6. MARCHANTIA POLYMORPHA var. AQUATICA L.

(F 3) On end of log, in splash of a small "fall" near Rooster Rock, Bridal Veil, Oregon, Aug. 9, 1905. Det. Miss Clark.

Metzgeriaceae.

7. *RICCARDIA LATIFRONS* Lindb.

(A) On rotten logs with mosses and other hepatics, Hamilton, Wash., Feb. 11, 1905. (X) On end of old log, Hamilton, Wash., April 1, 1905 (T in part) On end of log, roadside below ferry, Hamilton, Wash., April 15, 1905. (494) On decaying log, open forest, Cathlamet, Wash., Sept. 22, 1906.

8. *RICCARDIA MULTIFIDA* (L.) Carruth

(945) On trunks of shrubs, vine maples, alders etc. near Aberdeen, Wash., Feb. 18, 1909. (906 in part). On alders, bank of Wishkah River, near Aberdeen, Wash., Nov. 10, 1908.

9. *RICCARDIA PALMATA* (Hedw.) S. F. Gray

(927) End of rotten log, Aberdeen, Wash., Dec. 20, 1908. (911 in part) Aberdeen, Wash., Dec. 15, 1908.

10. *RICCARDIA PINGUIS* (L.) S. F. Gray

On cobbles, spring branch, dense timber, Biddle's Ranch, above Vancouver, Wash., June 18, 1905. Det. Dr. Evans.

11. *RICCARDIA SINUATA* (Dicks.) Trevis.

(932 in part) On log, plants submerged, Sequelitchew Lake, near Takoma, Wash., June 6, 1906.

12. *METZGERIA CONJUGATA* Lindb.

(P) In crevice of rocks, protected, Merryette Falls, Hamilton, Wash., March 18, 1905. (S) On granite rock, deep shade, Iron Mountains, alt. 1800 ft. Hamilton, Wash., April 8, 1905. (W) On rock in timber of Cumberland Creek Cañon, Hamilton, Wash., April 15, 1905. (Z) On rock, Hamilton, Wash., April 15, 1905. (496) On rocks by roadside, Cathlamet, Wash., Sept. 30, 1906. (511) At base of alders, Cathlamet, Wash., March 5, 1907. (905b) On decaying stump, Aberdeen, Wash., Nov. 10, 1908. (944) On trunks of shrubs, vine maple, alders etc. in dense thickets, near Aberdeen, Wash., Feb. 18, 1909.

13. *PELLIA EPIPHYLLA* (L.) Lindb.

(514) On rotten "ties" old skid road, Cathlamet, Wash., March 22, 1907. Det. Miss Clark.

14. *PELLIA NEESIANA* (Gottsche) Limpr.

(514b) Side of decaying log, Birnie Creek, Cathlamet, Wash., March 6, 1907. Det. Dr. Evans. On wet ground, Aberdeen, Wash., March 20, 1909.

15. *BLASIA PUSILLA* L.

(g 3) On moist soil, bank of Willamette River, Magoon's Park, near Portland, Oregon, Aug. 7, 1905. (411) On soil under leaky flume, Rainier, Oregon, May 16, 1906. (887) Bluffs on bank of Wishkah River, Chehalis Co., Wash., Sept. 20, 1908.

Jungermanniaceae.

16. **MARSUPELLA EMARGINATA* (Ehrh.) Lindb.

On boulders everywhere from 1500-3500 ft. alt. Mount Hood Region.

**Marsupella emarginata*, *Cephalozia leucantha*, *Frullania franciscana* and *Anthoceros fusiformis* were sent to Miss Clark and determined by her.

17. *NARDIA CRENULATA* (Smith) Lindb.

On wet banks, Hamilton, Wash., Dec. 20, 1904. Det. Dr. Evans, who "suspects that these specimens represent an aquatic or subaquatic form of above species." (N) On sandstone, roadside, Hamilton, Wash., April 29, 1905. (512) Cathlamet, Wash., March 2, 1907. (904b) On wall of sandstone bed-rock, near Aberdeen, Wash., Nov. 10, 1908. (932) Clayey soil, Wishkah River, Aberdeen, Wash., Feb. 16, 1909. (930) Clayey soil, in the open, Aberdeen, Wash., March 20, 1909.

18. • *NARDIA OBOVATA* (Lyell) Carringt.

(Q) On sandstone, roadside, Hamilton, Wash., April 29, 1905.

19. *GYROTHYRA UNDERWOODIANA* M. A. Howe

(E No. 2) On rocks of bluff, below ferry, northern exposure, Hamilton, Wash., April 15, 1905. Det. Dr. Evans.

20. *JUNGERMANNIA LANCEOLATA* L.

(V in part) On wall of rocky bluff, below ferry, northern exposure, Hamilton, Wash., April 15, 1905. Det. Dr. Evans.

21. *JUNGERMANNIA ATROVIRENS* (Schleich.) Dumort.

(388) On soft sandstone. Wishkah River bluff, near Aberdeen, Wash., Oct. 3, 1908.

22. *LOPHOZIA INFLATA* var. *HETEROSTIPA* (Huds.) Lindb.

(E in part) In sphagnum marsh, Hamilton, Wash., April 2, 1905. (E) In sphagnum swamp, three miles from Hamilton, Wash., Sept. 16, 1904. Det. Dr. Evans.

23. *LOPHOZIA INCISA* (Schrad.) Dumort.

(X in part) On end of old log, Hamilton, Wash., April 1, 1905. (Y) On old log in protected position, Hamilton, Wash., April 2, 1905. (S in part) On granite rock, deep shade, Iron Mountains, alt. 1800 ft. Hamilton, Wash., April 18, 1905. (2 B) On log, protected, Hamilton, Wash., May 12, 1905. (493) On decaying hemlock stump up river, Cathlamet, Wash., Feb. 10, 1907. (909) Rotten chunk, Aberdeen, Wash., Dec. 15, 1908.

24. *LOPHOZIA OVATA* (Dicks.) M. A. Howe

(J 2) On tree, Clatsop Beach, Seaside, Oregon, Aug. 20, 1905.

25. *LOPHOZIA PORPHYROLEUCA* (Nees) Schiffn.

(J 2 in part) On tree, Clatsop Beach, Seaside, Oregon, Aug. 20, 1905.

26. *LOPHOZIA VENTRICOSA* (Dicks.) Dumort.

(421) On humus of rocks in Cañon "Cloud Cap Inn" Mt. Hood, Oregon, alt. 7862 ft. July 26, 1906.

27. *PLAGIOCHILA ASPLENIODES* (L.) Dumort.

(J) On northern face, rocky bluff, Hamilton, Wash., Feb. 25, 1905. (H 2) On old log in shady timber, Magoon's Park, near Portland, Oregon, Aug. 1905. (416) On soil in shade, foot of bluffs, Southern Pacific Ry., Oregon City, Oregon, June 25, 1906.

28. *MYLIA ANOMALA* (Hook.) S. F. Gray

(E) In sphagnum marsh, Hamilton, Wash., April 2, 1905. Det. Dr. Evans.

29. *LOPHOCOLEA CUSPIDATA* (Nees) Limpr.

(H) On upturned root, Hamilton, Wash., March 10, 1905. (Etc. in part) On log in thicket, Hamilton, Wash., April 22, 1905. (342) On north side big stone, "Rocky Butte" (East) Portland, Oregon, April 23, 1906.

30. *CHIOSCYPHUS PALLESCENS* (Ehrh.) Dumort.

(J in part) On northern face bluff, Hamilton, Wash., Feb. 25, 1905. (W) On log across trout brook, Hamilton, Wash., April 1, 1905.

31. *CHIOSCYPHUS POLYANTHUS* (L.) Corda *RIVULARIS* Nees.

(F) On side of O. R. & N. Ry. near Latourelle Falls, Oregon, in ice cold water, (Note. Fresh water crustaceae devour this greedily.) Aug. 12, 1904. (932) Tacoma, Wash., June 6, 1908.

32. *CEPHALOSIA BICUSPIDATA* (L.) Dumort.

(A) On rotten logs with mosses, Hamilton, Wash., Feb. 11, 1905. (T) On end of log, Hamilton, Wash., April 15, 1905. (Etc.) On log in thicket, Hamilton, Wash., April 22, 1905. (495) On decaying chunk in slough on bluff, Cathlamet, Wash., Sept. 22, 1906. (910) End of log, Aberdeen, Wash., Dec. 15, 1908.

33. *CEPHALOSIELLA DIVARICATA* (Sm.) Dumort.

(408) On decaying log, Mt. Taber, Portland, Oregon, April 29, 1906. (947) On decaying logs, near Aberdeen, Wash., March 10, 1909.

34. *CEPHALOSIELLA DIVARICATA* var. *SCABRA* M. A. Howe

(409) On bluffs, near A. & C. Ry. above Rainier, Oregon, May 16, 1906.

35. *CEPHALOSIA LEUCANTHA* Spruce.

Sphagnum bog, near Westport, Wash., April 29, 1908. Det. Miss Clark.

36. *CEPHALOSIA LUNULAEFOLIA* Dumort.

(A in part) On rotten logs with mosses, Hamilton, Wash., Feb. 11, 1905. (Y in part) On old log in protected position, Hamilton, Wash., April 2, 1905. (X in part) On end of old log, Hamilton, Wash., April 1, 1905.

37. *CEPHALOSIA PLENICEPS* (Aust.) Lindb.

(I) On old log roadside, Hamilton, Wash., April 22, 1905.

38. *CALYPOGEIA SUECICA* (Arn. & Perss.) C. Müll.

(892) Decaying wood, Chehalis Co. Wash., May 28, 1908.

39. *CALYPOGEIA TRICHOMANIS* (L.) Corda

(2 B in part) On log, protected, Hamilton, Wash., May 12, 1905.

40. *BAZZANIA TRICRENATA* (Wahl) Trevis.

(H) On inside of rotten stump, Hamilton, Wash., Jan. 21, 1905. (I) On rotten log, Iron Mountains, Hamilton, Wash., Feb. 2, 1905. (O!) In slanting crevice of rocky bluff, moist, well protected, light supply one-half or less, Merryette Falls, Hamilton, Wash., March 18, 1905. (907) Trunk bark hemlock, Aberdeen, Wash., Nov. 30, 1908.

41. *LEPIDOSIA REPTANS* (L.) Dumort.

(Y in part) On old log in protected position, Hamilton, Wash., April 2, 1905. (952) Near Aberdeen, Wash., April 3, 1909.

42. *BLEPHAROSTOMA TRICHOPHYLLUM* (L.) Dumort.

(V) On wall of rocky bluff, northern exposure, Hamilton, Wash., April 15, 1905.

43. *PTILIDIUM CALIFORNICUM* Aust.

(R) On logs and at base of trees, Iron Mountains, Alt. 1800 ft. (Not found at foot of mountain.) Hamilton, Wash., April 8, 1905. Note. At the base of trees; alt. 1500–3500 ft. abundant at the higher elevation. (908) Old logs, in deserted claim, Aberdeen, Wash., Dec. 15, 1908.

44. *DIPLOPHYLLEIA ALBICANS* (L.) Trevis.

(B 2) On soil base of boulders, Iron Mountains, Hamilton, Wash., May 6, 1905.

45. *DIPLOPHYLLEIA TAXIFOLIA* (Wahl.) Trevis.

(B 2 in part) On soil base of boulders, Iron Mountains, Hamilton, Wash., May 6, 1905. (510) On soil, roadside, old mill, Cathlamet, Wash., March 12, 1907.

46. *SCAPANIA BOLANDERI* Aust.

(A in part) On rotten logs with mosses, Hamilton, Wash., Feb. 11, 1905. (K in part) On rotten log, Hamilton, Wash., March 13, 1905. On rocks in edge of trickling water, Hamilton, Wash., 1905. (Q) On end of rotten log, Hamilton, Wash., April 1, 1905. (413) On trunks of trees, coniferous woods, Rainier, Oregon, May 16, 1906. (911) On shady log, Aberdeen, Wash., Dec. 15, 1908.

47. *SCAPANIA CURTA* (Mart.) Dumont.

(421) On humus rocks in cañon "Cloud Cap Inn" Mount Hood, Oregon, at 7862 ft. alt., July 26, 1906.

48. *SCAPANIA NEMOROSA* (L.) Dumort.

(N) On rocks, in tufts, Merryette Falls, Hamilton, Wash., March 18, 1905. (I in part) On rotten log, side of Iron Mountain. "Fissidens Cascade" Hamilton, Wash., Feb. 2, 1905. (497½) On humus in open forest, Cathlamet, Wash., Oct. 20, 1906.

49. *SCAPANIA DENTATA* Dumort. var. *OAKESII* Aust.

(M) In tufts on rocks, Merryette Falls, Hamilton, Wash., March 18, 1905.

50. *SCAPANIA UMBROSA* (Schrad.) Dumort.

(X in part) On end of old log, Hamilton, Wash., April 1, 1905. On leaning alder, deep shade, Cathlamet, Wash., March 30, 1907. (911 in part) On log, shady, Aberdeen, Wash., Dec. 15, 1908.

51. *SCAPANIA UNDULATA* (L.) Dumort.

(L in part) On shrubs along slough, quite wet, Hamilton, Wash., Feb. 25, 1905. (g No. 2) On bank of river below ferry, in edge of stream, Hamilton, Wash., April 15, 1905.

52. *RADULA BOLANDERI* Gottsche

(929 and 945 B) Aberdeen, Wash., March 13, 1909. (A in part) On rotten logs with mosses, Hamilton, Wash., Feb. 11, 1905. (497) Bark of

young spruce, bluffs below Cathlamet, Wash., Sept. 23, 1906. (511 in part)
At base of alders, Cathlamet, Wash., March 5, 1907. (492b) Cathlamet,
Wash., Jan. 26, 1907.

53. *RADULA COMPLANATA* (L.) Dumort.

(K) On rotten log in shelter, Hamilton, Wash., March 13, 1905. (No. C 2) On vine maple, near Town Hall, Hamilton, Wash., May 24, 1905. (492 C) On willow in swampy tide-flat below Cathlamet, Wash., Oct. 29, 1906. (492) On bark of alder trees, open woods, Cathlamet, Wash., Feb. 16, 1907.

54. *PORELLA NAVICULARIS* (Lehm. et Lindenb.) Lindb.

(C) On trees, brush, etc abundant, Hamilton, Wash., Oct. 20, 1904. (Abundant everywhere west of the Cascades, Foster). (931) On shrubs, in thickets, Aberdeen, Wash., March 20, 1909. Another specimen collected same locality, March 13, 1909. These two last mentioned specimens show this species possessing the modification due, Dr. Howe believes, to the influence of an epiphytic fungus. "The leaves were *bilobed* rather than *bipartite*, the union of the lobes resembling that of *Lejeunea* or *Radula*. The ventral lobes were shortened so that their longer axils was nearly parallel to the dorsal lobe and were conspicuously inflated as in most of the *Lejeuneae*. The underleaves were also shortened and often ventricose." For fuller details see Howe: The Hepaticae and Anthocerotae of California, page 168. This Washington species was found growing with *Radula complanata* and *Radula Bolanderi*, a fact Dr. Howe mentions in connection with those found in California.

55. *PORELLA RIVULARIS* (Nees) Trevis.

(L) On shrubs along slough, quite moist, Hamilton, Wash., Feb. 25, 1905. On leaning alder, deep shade, Cathlamet, Wash., March 30, 1907. Det. Miss Clark. (931) On shrubs in thicket, Aberdeen, Wash., March 20, 1909.

56. *PORELLA ROELLII* Steph.

(339) On ledge of loose stones, McCleay Cañon, Portland, Oregon, April 9, 1906. (340) On rocks in shade, high bluffs, Oregon City, Oregon, April 16, 1906. (K 2) On basaltic bluff overlooking Bridal Veil Falls, 80 ft. high, Bridal Veil, Oregon, 28 miles from Portland, Oregon, by O. R. & N. Ry. up Columbia River, Aug. 9, 1905.

57. *FRULLANIA BOLANDERI* Aust.

(702) On trunk of *Populus tremuloides*, Henry Island, facing "Canal de Haro" Puget Sound, Wash., July 11, 1907. Det. Miss Clark.

58. *FRULLANIA CALIFORNICA* Aust.

(341) On porphyritic wall, northern exposure, Cliffs, "Stoney Butte" (East) Portland, Oregon, April 23, 1906.

59. *FRULLANIA FRANCISCANA* M. A. Howe

On *Pinus contorta*, Westport, Wash., April 15, 1908. Det. Miss Clark.

60. *FRULLANIA NISQUALLENSIS* Sulliv.

(D) On trees, shrubs, etc. not abundant, Hamilton, Wash., March 11-20, 1904. (J 26) On trees, Oregon, Aug. 20, 1905. (497 in part) Bark of young spruce, bluffs below Cathlamet, Wash., Sept. 23, 1906. (515) On bark of tree trunks, chunks, sometimes on rocky face of wall, Cathlamet, Wash., abundant, Jan. 20, 1907. (410) On live hemlock, hills back of Rainier, Oregon, May 16, 1906. (806) Alders back of Wishkah River near Aberdeen, Wash., Nov. 10, 1908. Another specimen, same locality, March 13, 1909.

Anthocerotaceae.

61. *ANTHOCEROS PEARSONI* M. A. Howe

(497) On *Pinus contorta*, Clatsop Beach, Seaside, Oregon, Aug. 19, 1905.

62. *ANTHOCEROS PUNCTATUS* L.

On soil in Cañon, Balch Creek Road, Portland, Oregon, July 3, 1905.
Det. A. S. Foster.

63. *ANTHOCEROS FUSIFORMIS* Aust.

Clay soil cuts, Carson Heights, Portland, Oregon, June, 1906. Det. Miss Clark,
Highlands, New Jersey.

LICHEN NOTES No. 11.

Describing *Parmelia endoxantha*, a new species; *Parmelia olivacea multisporum*, a new combination; and three little known *Parmelia* species hitherto inadequately diagnosed.

G. K. MERRILL.

PARMELIA SULFURATA Nees et Flot. in *Linnaea*, 1834 p. 501.

Reaction K_+^+ fulvescent, C_-^- but faintly.

Thallus glaucescent, ashy-white or whitish, expanded, orbicular, loosely appressed, lobed, divisions irregularly developing with more or less recurved ascendant borders, peripherally the lobes rather more depressed and broader, with the margins entire or crenate; destitute of cilia, centrally thinly isidiose, rarely subglobose sorediate marginally; above somewhat shining or nearly opaque, and here and there complicate-rugulose; within yellow or whitish-sulphureous; below black and interruptedly short-rhizinoso centrally, but broadly glabrous or yellowish-brown at the circumference. Apothecia cup-shaped, pedicellate, medium, disk yellowish-red, the margin faintly erose-crenulate. Spores $20-26 \times 9-12\mu$

On trunks of forest trees.

Examined from Tampico, Mexico, C. G. Pringle, and Island of Jamaica, Miss C. E. Cummings. Variouslly reported from our Southern States and the West Indian Islands. The species somewhat resembles *P. cristifera* Tayl. and *P. corralloidea* (Mey & Flot.) Wain., and in its sorediate conditions is sufficiently like *P. perlata* of Tuckerman's conception to be readily

mistaken for that plant. The lobes are broader than in the other *Parmelia* species with a colored medulla. *P. immiscens* Nyl. Flora, 1885, p. 606, is somewhat similar to the present. The medulla is yellow or sometimes white, apothecia crowded, spores small, and the reaction is distinctly K^+ for the medulla.

P. PERSULFURATA Nyl. in Flora, 1885, p. 606.

Reaction K^+ , C^- .

Thallus ochroleucous, greenish or yellowish-green, somewhat expanded in old plants, loosely attached, irregularly orbicular, membranaceous-cartilaginous, lobate, the lobes moderately divided, axils acute, and of medium width, irregularly radiant, contiguous and subimbricate, confusedly plicate and sometimes subcoalescent centrally, where also more or less exasperate-lobulate, borders of the major divisions crenate, decurved or sub-ascendant, but appressed and plane at the tips, the lobuli both ascendant and depressed with the margins rather incised-crenate, sparsely sub-sorediate on the borders of the lobes, the margins somewhat isidiose, likewise the surface of the thallus sparingly, and the margins of the lobuli copiously; above opaque and interruptedly rugulose; within distinctly sulfureous; below exactly as in *P. sulfurata*. Apothecia not seen.

On trunks in tropical forest.

Examined from Sanford, Florida, S. Rapp. Reported from Louisiana, Mexico and Cuba.

Crombie states that Tuckerman failed to distinguish this species from *P. sulfurata*, but the plants are absolutely unlike in color and in some other particulars as a comparison of the descriptions will show.

P. AURULENTA Tuck. Suppl. I, p. 424.

Reaction K^+ , C^+ orange.

Thallus glaucous, glaucescent or ashy-glaucous, moderate in size, orbicular, loosely attached, submembranaceous, lacinate, variably divided, the axils rounded, laciniae subimbricate, borders sinuous or crenate, tips retuse or markedly incised-crenate, in typical states displaying sub-marginally, exasperate, rounded or sometimes confluent sub-isidiose soredia, but other conditions observed that are merely papillose-isidiose; above rugulose and opaque; within yellowish; below black except narrowly brownish at the margins, with concolorous rather abundant short rhizinae. Apothecia medium, short-pedicelled, cup-shaped, disk pale-chestnut or darker, with a distinctly tuberculate-crenate inflexed margin, the exciple papillose-isidiose, isidio-sorediate, or at times smooth. Spores ellipsoid $9-17 \times 4-7\mu$.

On trunks of trees and on rocks.

Examined from Ottawa, Ontario, J. Macoun; from the vicinity of Baltimore, Maryland, C. C. Plitt. Reported from various Eastern States and from Newfoundland, but apparently not found in the West.

The configuration of the laciniae, rounded axils, and black rhizino-se under surface serve to ally this species with *P. laevigata* of Europe, but its distinctness is now admitted on all hands. *P. laevigata* of Tuckerman's

Synopsis describes the European plant of that name, but the cited specimen from Louisiana as examined in his herbarium is not in accord with the description, nor is it in agreement with the beautiful and strongly differentiated tropical plant recognized by Wainio and others as *P. laevigata*. A plant of some similarity to both *P. aurulenta* and *P. laevigata* is *P. isidiocera* Nyl. Syn. p. 382. It is white within as in *P. laevigata*, is here and there isidiose particularly at the margins of the laciniae, the isidia being yellow within. The species is only known from Arctic America.

P. endoxantha Merrill sp. nov.

Reaction K_+^- faint, C_+^- orange, $K(C)_+^+$ orange.

Thallus yellowish-glaucous, moderately expanded, appressed, and somewhat adherent, irregularly orbicular, sub-membranaceous, laciniate, the laciniae confusedly imbricated, moderately divided, somewhat pinnately cleft, the axils both major and minor rounded, laciniae convex but plane at the tips, borders sinuous, incised-crenate and retuse at the tips; destitute of soredia, or cilia; above opaque, commonly smooth but sometimes rugulose, or rarely and sparsely papillose-isidiose; within pale or distinctly yellow; below brown or black and moderately provided with short concolorous rhizinae. Apothecia centrally situated, appressed, small to medium, disk plane or slightly concave, chestnut or reddish-chestnut, with a thin rather erect crenate or annulate margin. Spores ellipsoid $10-11 \times 7\mu$, 8 in each theke.

On Palmetto logs in Hammock. Sanford, Florida, S. Rapp, July, 1907.

Comparable with the European forms of *P. tiliacea*, but a more robust plant than are the American representatives of that species. *P. endoxantha* is irreconcilable with what Tuckerman designated as *P. tiliacea* d. *sulfurosa*, for that form is likened to his b. *sublaevigata*, and furthermore it is said to be microphylline. *P. xanthomyela* Nyl a European species provided with a yellow medulla is comparable with *P. laevigata*, and its nearest American affinity is *P. aurulenta*. Tuckerman says of the *Parmelia* species with a yellow medulla that "It appears impossible in any large view whether of *P. sulfurata*, *P. aurulenta* or *P. tiliacea sulfurosa* to assign any other than a subordinate value of the modifications in these lichens of the medullary color." Such an opinion might be assented to if the medullary color constituted the only factor of difference, but in each of the several species here described other and marked elements of diverseness help to dissociate the plants and confirm specific identity.

P. olivacea* var. *multisporum (Schneider) Merrill comb. nov.

P. MULTISPORUM Schneider. Guide, p. 254.

Reaction. Not affected by either K or C.

Thallus olivaceous or brown, small, appressed, rather adherent, orbicular when space occupied permits, submembranaceous, lobate-laciniate, moderately divided, narrowed and confusedly-imbricate centrally, usually platyphylline at the circumference, borders sinuous but crenate at the tips; typically without soredia, cilia, or isidia; above opaque or sub-shining, smooth

or rugulose; within white; below black and short rhizinose. Apothecia very numerous, small or medium, short pedicelled, disk concave, chestnut or dark brown, shining or opaque, with a concolorous slightly elevated dentate or crenate or verrucose at times inflexed margin, the exciple at length rugulose. Spores variable in number, at times only 8 in each theke, and again in the same thecium affording others with 12, 16, 22, 24, 28, 32, and according to Schneider 50 or 100 spores. The dimensions of the spores in the plants of my examination are $5.9 \times 5.7 \mu$ but Schneider records $5 \times 4 \mu$, and states that the spores are ellipsoid. Within my observations the spores are as often rounded as ellipsoid.

Examined from Cathlamet, Washington, A. S. Foster, found on *Acer circinatum* and *Crataegus* sp.; Spokane, Wash., T. A. Bonser on *Crataegus Douglasii*. Reported from Washington, Idaho and Utah.

There can be no question of the affinity of this plant with *P. olivacea* rather than with *P. taeniata* as conjectured by Schneider. *P. taeniata* is a plant of the stock of *P. (Anzia) colpodes*. Rockland, Maine.

SULLIVANT MOSS SOCIETY NOTES.

New Members.—No 194. Mr. Fred. J. Lazell, Cedar Rapids, Iowa. No. 195. Miss Margaret Flockton, Botanic Gardens, Sydney, N. S. W., Australia. No. 196. Signor Egidio Corti, 67 Corso Magenta, Milan, Italy.

Any of our members having good fruiting specimens of North American mosses which they would like to exchange for those of northern Italy, please communicate with our new member Egidio Corti, 67 Corso Magenta, Milan, Italy. He offers some one hundred species.

Note change of address for Miss Mary F. Miller, to R. F. D. 4, Washington, D. C.

OFFERINGS.

(To Society Members only. For postage.)

Mr. W. W. Calkins, Berwyn, Ill., wishes to call attention to a correction of determination for *Leskea polycarpa* Ehrh., offered by him in March, 1909. It is probably a depauperate form of *Leskea obscura* Hedw., certainly not *L. polycarpa*.

Miss Mary F. Miller, R. F. D. 4, Washington, D. C. *Peltigera aphthosa* (L.) Hoffm. Collected Cabin John, Maryland.

Mr. R. H. Howe, Jr., Thoreau Museum, Middlesex School, Concord, Mass. *Ramalina reticulata* (Neohd.) Krempf. Collected in California.

Mr. E. B. Chamberlain, Cumberland Center, Maine. *Dolichomitra cymbifolia* (Ldbg.) Broth. cfr., and *Venturiella japonica* (Mitt.) Broth. cfr. (= *Erpodium japonicum* Mitt.). Collected in the Province of Kōchi Japan, by Prof. Okamura.

Rev. James Hansen, St. John's University, Collegeville, Minnesota. *Platygyrium repens* (Brid.) B. & S. cfr. Collected Collegeville.

Prof. Thomas A. Bonser, Spokane College, Spokane, Wash. *Pogonatum alpinum* (L.) Roehl., collected British Columbia; *Porella rivularis* (Nees) Trev. Collected Liberty Creek, Wash.

Mr. D. Lewis Dutton, R. F. D. 2, Brandon, Vermont. *Pellia epiphylla* (L.) Corda; *Sphagnum Warnstorffii* Russ. Collected Vermont.



SEPTEMBER 1909



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICS AND LICHENS

FOUNDED IN 1898
By
ABEL JOEL GROUT, Ph.D.

EDITOR
ANNIE MORRILL SMITH

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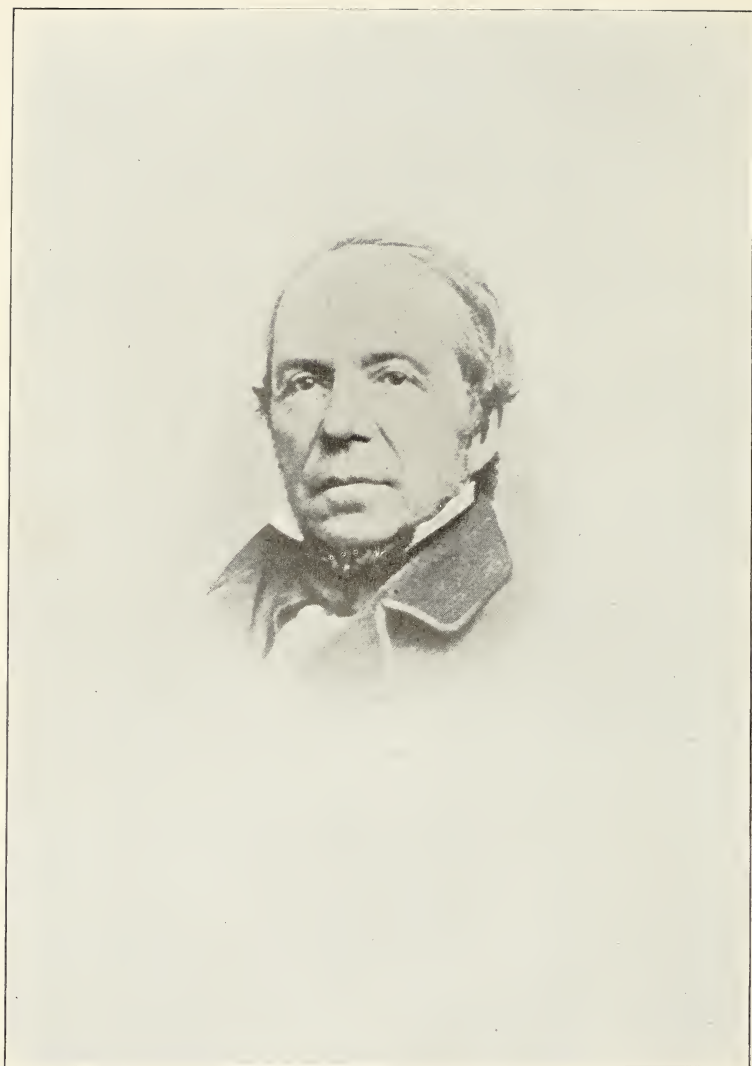
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THE BRYOLOGIST

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No. 5

LEO LESQUEREUX 1806-1889.

ANNIE MORRILL SMITH.

For a number of years we have been trying to obtain data for a reasonably full account of the life and work of Leo Lesquereux, but the material on which to base such a sketch seems most difficult to obtain. There is an interesting article in *The Popular Science Monthly*, for April, 1887, Vol. 30, No. 6, by L. R. McCabe, which is a report of a personal visit to Dr. Lesquereux in his home, at Columbus, Ohio, made not so long before his death which took place on October 25, 1889. One reason why the botanical journals of the time failed to record his death is that for so many years his time had been given exclusively to Paleobotany and hence the omission by botanists to notice his passing. The following is based on McCabe's article.

Charles Leo Lesquereux was born at Fleurier, Neuchâtel, Switzerland, November 18, 1806. His immediate ancestors were French Huguenots. His father was a manufacturer of watch springs and wished his son to follow the same trade, but his mother favored the ministry as her son's health was delicate. The love of nature was already deep in his heart and circumstances later determined his preference for another pursuit. After finishing his studies at the Academy of Neuchâtel he went to Weimer. Here he met the lady who later became his wife, and brought her back to live at Fleurier, where he began the study of mosses and later of fossil botany. It was at this period that he became interested in peat, its formation, and possible reproduction. The protection of the peat-bogs, the principal fuel of Switzerland, was then a matter of great importance to the government. Lesquereux published some memoirs of his investigations, and these attracted the attention of Agassiz, then occupying the chair of Natural History in the Academy of Neuchâtel. He invited the author to visit him for a consultation on the theories set forth, and thus a friendship was started which ended only with Agassiz's death. Later a prize was offered by the government for the best popular treatise on the formation and reproduction of peat, and the memoir by Lesquereux won the gold medal and gained wide reputation for the author, and it is still quoted as one of the best authorities on the subject. The author subsequently explored the peat-bogs of northern Europe becoming master of the botany, physics, chemistry, and geology of those districts, and was led to think that the theory he had formulated might be applied to the coal seams of our country. To the New World he now transferred his labors, coming in 1848, when having become totally deaf, in the prime of life, he also found himself deprived of scientific employment at home in consequence of the political changes following the revolution.

He came to Boston, and became an inmate of the Agassiz household, working on the botanical part of Agassiz's "Journey to Lake Superior" until Christmas Eve., 1848, when at the invitation of William Starling Sullivant he went to Columbus, Ohio, and, entering that eminent bryologist's laboratory, continued the study of mosses.

At the close of the year 1849, under the advice and with the co-operation of Mr. Sullivant, he made a tour of exploration among the mountains of the Southern States, for the collection of plant specimens, and secured a great variety of plants, which found a ready sale among scientific students. He was particularly successful in the collection of mosses. The preparation of the specimens, their determination and distribution, gave him employment for two years, and resulted in one of the most valuable contributions to American bryology—the "*Musci Americani Exsiccati*," by W. S. Sullivant and L. Lesquereux. The expense of preparation and publication of this work was defrayed by Mr. Sullivant, who allowed his colleague the benefit of the sales. Using that author's library and herbarium—now the property of Harvard College—for their common studies, Lesquereux lent most valuable assistance to the preparation of Mr. Sullivant's works on the mosses of the Wilkes' South Pacific Exploring Expedition, Whipple's Pacific Railroad Exploration, and the "*Icones Muscorum*." The publication of Brongniart's "*Prodrome*," and the commencement of the "*Histoire des Végétaux Fossils*," in 1828, laid the solid basis upon which the science of paleobotany has been erected. Lesquereux began to write in 1845, and his studies in America have been directed especially in the line of fossil botany. His most valuable researches, beginning in 1850, lay in the study of coal formations of Ohio, Pennsylvania, Illinois, Kentucky, and Arkansas, and his reports appear in the geological surveys of all these States. Particularly important are his studies of the coal flora of Pennsylvania, published in the report of H. D. Rogers in 1858, together with a "Catalogue of the Fossil Plants which have been named or described from the Coal-Measures of North America." Lesquereux also worked up the coal flora in the second geological survey of Pennsylvania. The fruit of this labor was two volumes of text and an atlas, published in 1880—the most important work on carboniferous plants that has been produced in America. Geological work, especially researches on fossil botany, in connection with the United States Geological Surveys of the Territories, began in 1868 to absorb his attention. He was employed to work up the collection of Dr. F. V. Hayden's surveys of the Territories, and important papers on the subject appeared in the annual reports of the surveys from 1870 to 1874 inclusive. Lesquereux was frequently called to Cambridge to determine the specimens of fossil plants in Professor Agassiz's museum, where he was a guest in the naturalist's household for weeks and months at a time, and his attachment to him grew very strong.

The fraternal bond that binds the scientific world is very strong as was witnessed by his attachment to Guyot and Agassiz, the former coming to this country at the same time as Lesquereux, and both only two years after Agassiz arrived.

LIST OF WORKS AND MEMOIRS PUBLISHED BY PROFESSOR LEO LESQUEREUX.

1. Catalogue of the Mosses of Switzerland and Mennirs. Natural History Society. Neuchâtel. 1840.
2. Explorations of Peat-Bogs. Received gold medal prize from the Government of Neuchâtel.
3. Directions for the Exploration of Peat Bogs. 1844.
4. Letters written on Germany. 1846.
5. Letters written on America. 1849-1855.
6. Botany of Agassiz's Lake Superior. 1848.
7. New Species of Fossil Plants. Boston Journal of Natural History. 1854.
8. Paleontological Report. Pennsylvania Geological Report. 1857.
9. Paleontological Report. Kentucky Geological Report, vol. iii. 1857.
10. Paleontological Report. Kentucky Geological Report, vol. iv. 1861.
11. Catalogue of the Fossil Plants of the Coal-Measures of Pennsylvania. 1858.
12. Paleontological and Botanical Report. Arkansas Geological Report. 1860.
13. Paleontological and Geological Report of Indiana. 1862.
14. Paleontological Report of Illinois. Worthen's Geological Report, vol. ii. 1866.
15. Paleontological Report of Illinois. Worthen's Geological Report, vol. iv. 1870.
16. Catalogue of California Mosses. Transactions of American Philosophical Society, vol. xiii. 1864.
17. On Tertiary Fossil Plants of Mississippi. Transactions of American Philosophical Society, vol. xiii. 1864.
16. On Fucoids in the Coal. Transactions of American Philosophical Society, vol. xiii. 1864.
17. On Pacific Coast Mosses in California. Academy of Sciences. 1868.
18. Musci Exsiccati, first edition. In association with W. S. Sullivant, 1856.
19. Musci Exsiccati, second edition. 1865.
22. Report to Hayden. United States Geological and Geographical Survey of the Territories. 1870.
- 23-26. Report to Hayden. 1871-1873.
27. Monograph of the Cretaceous Flora of the Dakota Group. 1874.
28. Review of the Fossil Flora of North America. (Republished, with corrections, in the Penn Monthly), 1875.
29. Article on Coal and Coal Flora. Encyclopaedia of North America.
30. Text (Latin) of Sullivant's Supplement to the Icones. 1874.

31. On Some New Species of Fossil Plants, Tertiary. Bulletin 52, second series of Hayden. 1875.
On Some New Species of Fossil Plants, Cretaceous. 1875.
32. Report on the Cretaceous and Tertiary Floras of Western Territories. Hayden's Report, and separate copies. 1874.
33. Species of Fossil Marine Plants found in the Carboniferous Measures. Geological Survey of Indiana, Seventh Annual Report. 1876.
34. Plants of the Silurian. Proceedings of the Philosophical Society of Philadelphia. 1877.
35. Contributions to the Fossil Flora of the Western Territories. United States Geological and Geographical Survey.
The Tertiary Flora. 1877.
36. Pliocene Flora of the Auriferous Gravel of California. Museum of Comparative Zoölogy, Cambridge. 1878.
37. Catalogue of the Fossil Plants of the Tertiary and of the Cretaceous. Hayden's Report. 1878.
38. On Cordaites. American Philosophical Society. 1878.
39. On a Branch of Cordaites bearing Fruit. American Philosophical Society. 1879.
40. The Coal Flora (Atlas). Second Pennsylvania Geological Survey. 1879-1884.
41. The Coal Flora (Text). Three volumes. 1880-1884.
42. Manual of the American Mosses. With Collaboration of Thomas P. James. 1884.
43. Monography of the Cretaceous and Tertiary Flora of the United States. Geological and Geographical Survey of the Territories, vol. viii. 1883.
44. Principles of Palæozoic Botany. Geological Report of Indiana. 1884.
45. Vegetable Origin of Coal. Report of the Geological Survey of Pennsylvania. 1885.
46. Divers Questions concerning Coal. Silliman's Journal. 1860.
On the Fossil Fruits of the Lignites of Brandon. 1861.
On Some Fossil Plants of the Recent Formations. 1859.
On Some Fossil Plants of John Evans. 1859.
On the Origin and Formation of the Prairies. 1865.
On the Formation of Lignite Beds. 1874.
On Land Plants in the Lower Silurian. 1874.

See further articles in Am. Jour. Science, III, 38: 499-500, 1889. Bot. Gaz. 15: 16-19, 1890. Ann. Bot. 3: 467-470, 1890. Proc. Am. Acad. 25: 320-324, 1890. Am. Geol. 5: 291, 292, 1890. Monog. U. S. Geol. Surv. 17: 15-18, 1892.

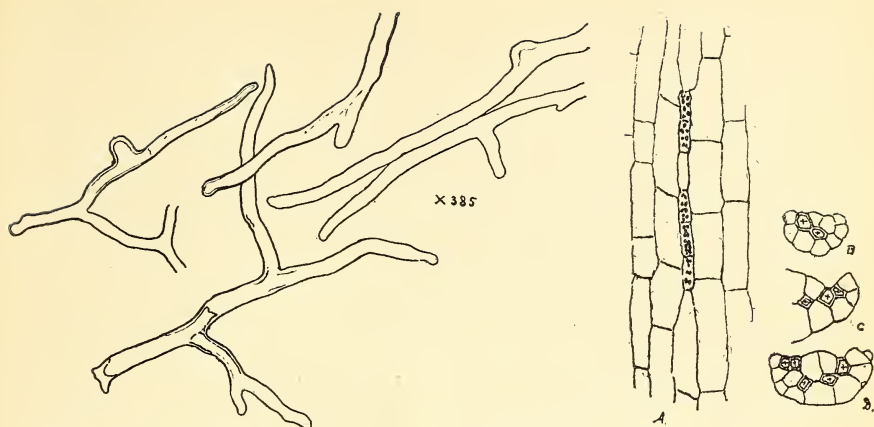


PLATE X. Fig. 1. A few isolated Rhizoids $\times 385$. Reduced $\frac{1}{2}$.

Fig. 2. A. Underside of perichaetial leaf, showing a row of rhizoids-producing cells.

B, C, D. Cross sections through the apex of the ordinary leaves, chlorophyll bearing cells marked X (After Correns).

ASEXUAL REPRODUCTION OF LEUCOBRYUM GLAUCUM.

CHARLES C. PLITT.

In the fall of 1907, and then in the early spring of 1908 I found a peculiar looking *Leucobryum glaucum*. There was no doubting the moss to be *L. glaucum*, but the apical portion of nearly all the specimens of the patch seemed to be attacked by a fungus. Being more particularly interested in the lichens, I thought at first that I possibly had made some interesting and perhaps rare find in lichen study. Expecting to find some apothecia among the many fungus masses, I examined them most carefully with a hand lens, but none were found, nor any likewise later when looked at under the microscope. A sample of the first specimen was sent to Mrs. Smith and the remaining portion laid aside for the time being.

Some time later, Mrs. Smith wrote the following and referred me to Correns:* . . . "It is not attacked by a fungus as you queried, but it is the regular asexual propagation, which is more or less common though this is the first time I have seen it." . . . Examining this apparently "fungus" growth with a microscope, one gets the impression that one was looking at a tangled mass of root hairs. Braithwaite, according to Dr. Grout,† states that this species (*L. glaucum*) often produces on the upper leaves of the female plants minute tufts of "radicular tomentum" with young plants which fall off and serve to reproduce the plant which produces spores rather infrequently.

* Untersuchungen über die Vermehrung der Laubmoose durch Brutorgane und Stecklinge, by Dr. Carl Correns.

† Mosses with Hand-lens and Microscope, p. 109, and Mosses with a Hand-lens p. 50.

These root-hair like threads fork frequently, intertwine one with another and thus form the impenetrable fungus-like masses; they are of an almost uniform diameter, averaging 6μ although some are found as small as 3μ and some as large as 9μ (Figure 1).

According to Correns (l. c. p. 45), it has long been known that the leaves can produce rhizoids. Schimper, as early as 1848, saw them mainly at the apex of the bracts surrounding the reproductive organs. These rhizoids intertwine and form a thick felt, which prevents any further development of the stem. Upon this felt plantlets develop, after which the entire tuft is covered with them, decays, and forms a substrate for the new plants. He states, that this mode of reproduction happens so frequently, that the spreading of this seldom fruiting moss depends upon it. Berggren, on the other hand, found rhizoids at the apex of the lower leaves, but seldom found any young plants developing, at any rate as long as the leaves remained attached to the parent plants. However, he observed, that when the leaves for some to him unknown cause, perhaps due to age, began to fall, often lying in masses around the tuft, that, not only from the apices but also from the bases of these leaves, rhizoids developed and also green protonemata, and upon both young plants developed. Upon attached leaves, he never found protonema.

To the above two modes, Correns adds still a third mode of asexual reproduction and classifies them as follows:

1. The formation of rhizoids at the apex of attached normal leaves.
2. The formation of rhizoids upon attached perichaetial leaves. (Found only on female plants).
3. The formation of leaves readily breakable from the parent stem. (Brutblätter).

First—The formation of rhizoids at the apex of attached leaves, so far as Correns was able to learn, took place rather late in the life of the leaf, probably in its second year, when it was some distance down the stem and took no longer an active part in assimilation. In all the cases he examined the formation of rhizoids was limited to the upper surface of the apex of the leaf. It is well known that the leaf of this moss is composed of two kinds of cells, of living chlorophyll bearing assimilative cells, and of dead transparent water bearing cells, the latter surrounding the former. Of course the rhizoids can not arise from the transparent cells. Close examination reveals the fact, that although the green cells are surrounded by the transparent ones, yet near the apex one finds, almost constantly, especially on the upper surface, the green cells, right at the surface. It is from these cells that the rhizoids originate. (Fig. 2. B, C, and D).

Second—The formation of rhizoids upon perichaetial leaves, Correns finds only upon unfertilized female blossoms. They take their origin from rows of chlorophyll-bearing cells lying between hyaline cells on the back of the leaf (Fig. 2. A). It is mainly the innermost leaves that produce the rhizoids. These intertwine and form quite a thick grey felt and may grow from stem to stem. Protonemata he never found upon them nor ever any young plantlets.

Third—Brutblätter (brood-leaves), according to Correns arise on special shoots which may occur upon the same plant year after year. The leaves upon any one shoot diminish gradually in size from base to apex. At the base they run into the ordinary leaves. In shape they resemble ordinary leaves. They are composed of three layers of cells (a net work of chlorophyll bearing cells lying in between an upper and a lower layer of hyaline water bearing cells) quite like a thin ordinary *Leucobryum* leaf, but are provided with chlorophyll bearing cells superficially arranged upon the upper side at the tip and upon the under side at the base which function as rhizoid producers, producing the latter sometimes only at the apex, sometimes only at the base. Experimenting with the "Brutblätter" in nutrient solution Correns observed that protonemata were produced quite quickly sometimes from both apex and base, sometimes from base alone. Within a month very many young plants had formed.

Correns states, that apparently this last mode of asexual reproduction has not as yet been observed but that it occurs quite frequently. Since having my attention called to the fact, I have noticed that in the case of many tufts of this moss very many small leaves are made to fly off by simply rubbing the hand lightly over the top of the tuft; no doubt these are the Brutblätter Correns refers to.

Comparing the three modes, we note that in all cases, rhizoids are produced; in the case of the ordinary leaves, they arise from the upper side near the apex; in the case of perichaetial leaves, from the under side near the middle; and in the case of the Brutblätter from the under side at the base.

Both the specimens found are examples of the second mode of asexual reproduction, but although one was found a few months later than the other, I do not observe the slightest difference between them. As already stated, this mode is said to be quite common, but thus far, I have observed it but twice, in spite, too, of the fact that during the past year I made especial effort to find more cases. Others, also, to whom I have shown specimens, have never seen it, so possibly it may not be so very common after all. I would be pleased to hear from those who have observed it.

Correns never found any protonemata upon the rhizoids nor ever any plantlets, nor were either found upon any of my specimens.

In Dr. Grout's "Mosses with Hand-lens and Microscope," there is an illustration (Plate II) taken from Schimper's "Recherches," showing this particular mode of reproduction. Those interested in the asexual reproduction of mosses should read this chapter in Dr. Grout's book, and also Dr. Best's article on "Vegetative Reproduction of Mosses" in the *BRYOLOGIST* for January, 1901.

Any member of the Sullivant Moss Society, wishing to have a small specimen of the *Leucobryum glaucum* showing this interesting "radicular tomentum" may get one by sending a self-addressed envelope to the writer.

My thanks are due to Mrs. Annie Morrill Smith for her many courtesies.
3933 Lowndes Ave., Baltimore, Maryland.

A BLUNDER IN NOMENCLATURE.

I. HAGEN.

Among the synonyms of *Neckera complanata* we find *Eleutera ornithopodioides* Stuntz. Mr. S. C. Stuntz established this combination (Torrey Bulletin, Vol. 27, April, 1900), because *Hypnum complanatum* L. as published in 1763 was superseded by *Hypnum ornithopodioides* Scop. 1760.

This conclusion was based upon quite false premises.

At first sight those acquainted with the early literature of the subject will consider it suspicious that a binary name was used by Scopoli in 1760. In the first edition of his *Flora Carniolica* issued that year, he had not yet accepted the Linnean nomenclature; it is only in the second edition (that of 1772) that he employs binary names. In fact, by examining the two editions, it proves that the name *Hypnum ornithopodioides* is not to be found in the first of them, but in the second there is described on page 320 an *Hypnum ornithopodioides* for which he quotes as synonym *Hypnum fronde subpinnata ramosa, foliis pellucidis acutis planis* Fl. Carn. ed. I, p. 150. This species is not, in ed. I, designated by any binary name; the latter dates consequently from 1772. It is possible that this *Hypnum ornithopodioides* is really *H. complanatum* L., as Bridel indicates, nothing in the imperfect description preventing this supposition. But this identity does not appear from the synonyms quoted by Scopoli, among which one of Dillenius's and one of Linné's refer to an exotic plant which is *Rhacopilum tomentosum* according to other authors.

Thus, apart from the circumstance that *Hypnum ornithopodioides* Scop. 1772, is antedated by *H. ornithopodioides* L. 1753 and *H. ornithopodioides* Huds. 1762, the illicitness of rejecting the name *complanatum* and substituting that of *ornithopodioides* is sufficiently pointed out. But the situation becomes still more unfavorable for Mr. Stuntz when taking into consideration the fact that *H. complanatum* L. was published not only in 1763, but already in 1753, in the first edition *Species Plantarum*.

Mr. Stuntz quotes:

Hypnum ornithopodioides Scop. Fl. Carn. p. 104 (1760).

Hypnum complanatum L. Sp. Pl. p. 1588 (1763) instead of *Hypnum complanatum* L. Sp. Pl., ed. I, p. 1123 (1753).

Hypnum fronde subpinnata ramosa, foliis pellucidis acutis planis Scop. Fl. Carn., ed. I, p. 150 (1760).

Hypnum ornithopodioides (nec. L. nec. Huds.) Scop. Fl. Carn., ed. 2, II, p. 329 (1772). (The last two on the authority of Bridel).

The moral of this is to avoid second-hand quotations. Precaution is especially needed in using the early literature, which teems with incorrect quotations; when using it uncritically, that is, without going back to the originals, it is easy to compromise one's self.

Trondhjem, Norway.

MUSCI MEXICANI.

ELIZABETH G. BRITTON.

The first Century of C. G. Pringle's Mosses of Mexico was received on July 15th. It includes ninety-four species of which thirty-one are new and four belong to new genera, three are new combinations and five are new varieties and two new records for Mexico; a remarkable series of novelties as M. Cardot, who has named most of the new species, claims them to be! The specimens number one hundred and twenty-two, in some cases as many as four numbers are given for one species, they are generous in quantity and generally in good fruiting condition, thus constituting a valuable and most interesting addition to *American Exsiccatae*. But we are surprised to see that the labels are headed *Plantae Mexicanae* and not *Musci Mexicani* as the list issued with the set calls for, and the numbers are the collection numbers.

The new genera are *Dactylhymenium Pringlei* (Britt.) Card., *Husnotiella revoluta* Card., *Pringleella pleuridioides* Card. and *Synthesodontium Pringlei* Cardot which would at first sight be taken for a *Tortula*.

The new combinations are *Metzleria leptocarpa* (Sch.) Cardot which is the same as *Atractylocarpus mexicanus* Mitt.; *Octodicerus mexicana* (Sch.) (*Conomitrium mexicanum*) and *Symblepharis Schimperiana* (Par.) Card.

The two new records for Mexico are *Fissidens asplenioides* and *Polytrichum commune*. *Diphyscium foliosum* and *Hymenostylium curvirostre* also seem to be extension of ranges.

Of the thirty one new species it is impossible to give a quick verdict, as they will necessarily require some study and comparison; but *Trematodon Lozanoi* is most interesting, belonging close to the South American *T. gymnostomum* Lindb. but differing in size, annulus, etc. One of the most interesting species of the old ones is *Bryoxiphium mexicanum* which for the first time is issued in fruit. The capsules agree in all essentials with those of *Br. Norvegicum*.

Two interesting reductions are made, *Polytrichum juniperiforme* Sch. and *P. Ghiesbreghtii* Besch. are reduced to *P. juniperinum*. A few typographical errors have been made in the labels and list, and a few differences of usage in generic names as *Atrichum* and *Diphyscium* are noted.

We heartily recommend this set to all students of American mosses.

New York Botanical Garden.

WANTED.—Miss Caroline C. Haynes will be grateful for fruiting specimens of the genus *SPHAEROCARPUS* from tropical European and American stations. These will be returned to the owners, or exchanged for local species. Address Highlands, New Jersey.

CURRENT LITERATURE.

As some of our readers may not see "Science" we quote from the issue for March 27, 1908, the opening paragraphs from a review by A. F. Blakeslee, on the recent work of the Marchals "Aposporie et Sexualité chez les Mousses." El. and Em. Marchal. Bull. Ac. Roy. Belg. Cl. Sciences, No. 7, pp. 765-789.

"In a paper already reviewed in "Science," the Marchals have shown that the individual capsules of certain dioecious mosses contain both male and female spores and that regenerations from the leaves, protonemata or from other parts of the gametophyte give rise to the same sex as the plant from which they were derived. In the present paper they give the results of a careful investigation by means of pure cultures of the sexual condition in the sporophytes of the dioecious mosses—*Bryum caespiticium*, *Mnium hornum* and *Bryum argenteum*. They find that regenerations from the capsules or from its stalk, i. e., from any part of the sporophyte, give rise to the bisexual protonemata from each of which are developed three types of leafy axes: (1) Those apparently male containing only antheridia, (2) those obviously hermaphroditic containing both antheridia and archegonia, (3) those apparently female containing only archegonia. Shoots with only antheridia were most common, those with both antheridia and archegonia were considerably less abundant while those with only archegonia were distinctly rare. That the three different types of shoots were potentially hermaphroditic was shown by regenerations from their leaves. These gave in repeated cultures of *Bryum caespiticium* approximately the same ratio of shoots apparently male, hermaphroditic and female as were obtained directly by regeneration from the sporophyte and it is concluded that the hermaphroditic condition can be thus indefinitely propagated by vegetative means."

We quote the following from "Science," April 16, 1909. The article is headed "Lieutenant Shackleton's Antarctic Expedition." It says "The Wellington, New Zealand, correspondent of the London *Times* has cabled some details of the Shackleton Expedition. The frozen glacier-eroded lakes near Cape Royds abound in diatoms, rotifers, water bears and infusoria. Numbers of rotifer which were examined microscopically had been frozen into the ice at temperatures below zero for three years; yet after a few minutes' thawing out they suddenly revived and began eagerly devouring the fungus which abounds in these lakes. In some cases only the body, not the head, of the rotifer apparently came to life. Several rotifers were similar to those already described by Murray as having been found at Spitzbergen, Franz Joseph Land. The water bears came to life in the same manner.

"On the black lava rocks of Mount Erebus which had absorbed the sun's heat the snow melted at temperatures below zero and at a height of 9000 feet. This explains how lichens and similar plant life are enabled to flourish in the Antarctic regions."

In the Bulletin of the Torrey Botanical Club for April, 1909, Vol. 36, No. 4, there will be found an article on "Sex in dioecious plants" by Chester Arthur Darling, with three plates. It is a most important contribution to the study of the general problems connected with the determination of sex in plants. Experiments with two mosses *Barbula unguiculata* and *Ceratodon purpureus* are described as well as with other Bryophyta, such as *Marchantia polymorpha*, a Mucor and so on through the flowering plants.

The paper concludes with a list of the literature consulted.

Mr. W. E. Nicholson, Lewes, Sussex, England, has published in the "Hastings and East Sussex Naturalist," January, 1908, Vol. I, No. 3, a paper on "The Mosses of Sussex," pp. 79-110. It contains much of general interest and is also a model for similar work which could well be undertaken by a number of our Society members in their home localities.

In the "Revue Bryologique" for January, 1909, Mr. Nicholson has eight pages of "Notes on Mosses from South Tyrol and Carinthia." In the same publication for March, 1909, is a paper on "*Distichophyllum carinatum* Dixon and Nicholson, a species and genus of Mosses new to Europe," also "A Contribution to the Bryology of Tornean, Lapland; with a discussion on the relationship of *Mnium hymenophyllum* and *Mnium hymenophylloides*" by H. N. Dixon.

The Third Biennial Report of the Commissioners of the State Geological and Natural History Society of the State of Connecticut has been issued. It is to be obtained by addressing William North Rice, Hartford, Conn. It gives the plan and scope of the work and much valuable information.

We have been asked a number of times to give approximate figures for the different classes of plant life. This has been done stating the authority quoted. In a recent number of "The Ohio Naturalist," April, 1909, in an article by John H. Schaffner on The Classification of Plants, Part V., he gives an interesting account of the classification of the plant kingdom. We refer our readers to the article from which we take the following summary.

The phyla with their classes and approximate number of species, may be characterized as follows:

1. SCHIZOPHYTA. Fission Plants. 2,400 species.
2. MYXOPHYTA. Slime Moulds. 400 species.
3. DIATOMÆÆ. Diatoms. 3,000 species.
4. CONJUGATA. 1,200 species.
5. GONIDIOPHYTA. 2,000 species.
6. PHÆOPHYTA. Brown Algae. 1,000 species.
7. RHODOPHYTA. Red Algae. 2,000 species.
8. CHÆREÆÆ. Stoneworts. 160 species.
9. MYCOPHYTA. 47,000 species.
10. BRYOPHYTA. Hepaticææ, Sphagneææ, Andreaeææ, Musci, Anthocerotææ. 17,000 species.

11. PTEROPHYTA. Ferns and Isotes. 4,500 species.
 12. CALAMOPHYTA. Equisetaceae, etc. 25 species.
 13. LEPIDOPHYTA, Lycopodiaceae and Selaginellaceae. 660 species.
 14. CYCADOPHYTA. 90 species.
 15. STROBILOPHYTA. Conifers, etc. 400 species.
 16. ANTHOPHYTA. Flowering Plants, Monocotylae, Dicotylae, 125,000 species.
- Making a total of 206,835 species.

Forarbejder til en Norsk Lovmosflora av I. Hagen. (Det. Kgl. Videnskabers Selskabs Skrifter. 1907. No. 13) Trondhjem, Norway, 1908.

PART I. ORTHOTRICHACEAE.

This pamphlet of 100 pages will be interesting in many ways to those North American moss students who are able to read Norwegian, owing to the large number of species common to the two countries. The genera treated are: *Zygodon* (2 spp.), *Ulota* (9 spp.), *Orthotrichum* (37 spp.), *Stroemia* (2 spp.), and *Aulacomitrium* (1 sp.). Latin keys are given under each genus, as well as Latin diagnoses of all new forms. The most of the text, however, is in Norwegian and confined to notes upon the variations, historical treatment, and other points of interest connected with each species. A full list of localities are given. Detailed descriptions are given for all parts of *Orthotrichum abbreviatum* Grönv. to which *O. Sardagnae* Vent. is reduced. The following new combinations are made: *Zygodon viridissimus* (Dicks.) R. Br., var. *Stirtoni* (Schimp.) Hag. (*Z. Stirtoni* Schimp.); *Aulacomitrium Daviesii* Dicks.) Hag. (*Glyphomitrium Daviesii* Brid.). The following are described as new: *Ulota Drummondii* (H. & G.) Brid., var. *anceps* Hagen; *Orthotrichum nudum* Dicks., var. *norvegica* Hagen; *C. Killiasii* Muell.-Hal., var. *transitoria* Hagen. The genus *Stroemia* is proposed for the section *Obtusifolia* of *Orthotrichum*, comprising the species *S. gymnostoma* (Bruch) Hagen. and *S. obtusifolia* (Schräd.) Hagen.

An index of the genera and species mentioned concludes the work.

EDWARD B. CHAMBERLAIN.

A second pamphlet of one hundred and twenty-two pages with the above title, under date 1908, No. 9, was received in June of this year. It contains the following sections: II. Meeseaceae, III. Georgiaceae, IV. Disceliaceae, V. Neckeraceae, VI. Pseudoleskeaceae, VII. Thuidiaceae, and VIII. Leskeaceae. More of the text is in French than in the first part, reviewed by Mr. Chamberlain, the change being made at the suggestion of M. Thériot, who has also read the proof for this portion.

As stated in the preface of the first part, it is the intention of Dr. Hagen to issue a series of papers on the mossflora of Norway based on a study of the material in the Herbarium of the Natural History Museum of Trondhjem, of which he is Director. There is a large collection, and will require a vast amount of work with the microscope, and revision of critical groups, so it is evident that the work will take a number of years to accomplish. It is hoped to issue at least one pamphlet each year.

Fra E. Ryan's Mosherbarium af I. Hagen (Det. Kgl. Norske Videnskabers Skrifter, 1907. No. 1.), Trondhjem, 1907.

This pamphlet of thirty-six pages contains an account of the life and work of Elling Ryan, with his portrait. The collections made by this gentleman during his many years of traveling in Norway and Sweden were, after his death, given by his wife, Fru Annette Ryan, to the Herbarium of the Natural History Museum in Trondhjem, and forms the basis for the moss flora of these countries, the results being published from time to time as indicated in Forarbejder Til En Norsk Lovmosflora by Dr. Hagen, already reviewed.

Elling Ryan was born October 24, 1849. After he finished in the elementary schools he began to study for a pharmacist and while a college student took great interest in botany and learned to know the flowering plants with thoroughness. In 1874 he became a partner in a concern which manufactured oxalic acid, and was thus engaged until his death, April 25, 1905. His home was near Fredrikstad. He died at Buchsweiler, Elsass, while away on a business trip.

His list of writings comprise few numbers owing partly to his absorption in business, and partly to his aversion to literary work. A detailed account is given of the various localities where the collections were made and will be needed for all who use the results of the study as given in the series of papers to be issued by Dr. Hagen, as it will take some study to understand the localities referred to on our maps, the spelling being given in Norwegian.

The Mosses and Hepatics of Prince Charles Foreland, Spitzbergen, Dr. I. Hagen, Trondhjem. Reprinted from Trans. Bot. Soc. Edin., XXIII, 1908.

The collections described were made by Dr. W. S. Bruce, while exploring the Spitzbergen Archipelago in the summers of 1906 and 1907, and sent to Dr. Hagen for determination. The list of species is a short one, nineteen mosses and four hepatics, but one is a new variety namely *Hypnum uncinatum* Hedw. n. var. *foeneum* and one a new station for *Dicranum spadicum*. The account of the habit of growth of plants in this north country will be found most interesting.

Mousses Nouvelles, par Dr. I. Hagen. Det. Kgl. Norske Videnskabers Selskabs Skrifter. 1908. No. 3. Trondhjem, Norway.

This is a pamphlet of forty-four pages, and two double plates. The text is in French with the descriptions in latin. Sixteen new species or varieties are described, those with the star prefixed being illustrated. *Brachythecium coruscum*, **Brachythecium udum*, **Bryum arduum*, **B. bernense*, **B. Bornmuelleri* Ruthe mss., **B. Bryhnii*, **B. camurum*, *B. castaneum* Hag. var. *Bomanssonii*, *B. humectum*, **B. Islandicum*, **B. Kaalaasii*, **B. pedemontanum*, **B. rhexodon*, *B. riparium*, **B. spissum*, **B. umbratum*, *Fontinalis Bryhnii* Limpr. in litt. ad Bryhn 9/1, 1894, et 3/9. 1901.

ANNIE MORRILL SMITH.

SPHAGNUM FAXONII; AN ADDITION TO THE FLORA OF NEW ENGLAND.

CARL WARNSTORF.

We give this article from the well known authority on Sphagna by permission of the Editors of Rhodora, and follow it with one from H. H. Bartlett on the Type Locality. The first article is from Rhodora, March, 1908, and the second from Rhodora, June, 1908. A number of our students are devoting time to the Sphagna so that notes on the subject will be in order. EDITOR.

Since my friend the late Edwin Faxon was one of the original members of the New England Botanical Club, it seems fitting that the Sphagnum which I have recently named in his memory should be brought to the attention of his old associates by publishing in Rhodora a translation of the original description.* I wish to say, by way of preface, that Mr. Faxon, an indomitable collector of Sphagna, sent me for investigation during the nineties thousands of specimens from New England, all prepared with the most pains-taking care. To many others than myself "Sphagna Boreali-Americani Exsiccata," an extremely noteworthy collection of one hundred seventy-two representative specimens of American peat mosses issued by Faxon in collaboration with Professor D. C. Eaton, stands as testimonial to his persevering and accurate work as a collector. Faxon was preeminently lovable, unselfish and modest,—such a man as I have but seldom come in contact with during my life. He translated my "Contributions to the Knowledge of the North American Sphagna" for publication in the Botanical Gazette.† but although I urged him to do so, he did not associate his own name with the articles. I hope that in describing the following moss I have permanently connected the name of this truly exceptional man with his favorite genus.

SPHAGNUM FAXONII Warnst. Forming closely compacted tufts as much as 12 cm. deep, below grayish brown, above pale yellowish, in habit similar to a weak *Sph. cuspidatum* var. *plumosum*. Cortex of two or three layers of cells, plainly differentiated from the strong, pale or yellowish woody axis. Prosenchyma cells widened and thick-walled. Stem leaves (both dry and moist) spreading, isosceles-triangular or in part almost triangular-linguiform, 0.75-1.00 mm. long and 0.50-0.60 mm. broad, at the narrow truncate apex minutely denticulate, otherwise entire, with broad margins which are greatly expanded below the middle. Hyaline cells either not at all or only occasionally septate, fibrillose in the upper third or even to the middle of the leaf, on the inner surface mostly with a few unringed pores between the fibrils, on the outer surface, toward the apex, with a few small corner-pores. Fascicles moderately crowded, generally three- but occasionally four-branched. Branches almost equally strong and spreading, up to 12 mm. in length,

* Neue europäische und aussereuropäische Torfmoose. Hedwigia XLVII, p. 117, (1908).

† Bot. Gaz. XV, pp. 127-140, 189-198, 217-127, 242-255 (1890).

attenuated toward the apex; their leaves crowded, when dry not or hardly at all undulate, when moist slightly turned to one side, lanceolate, on the average 1.40-1.45 mm. long and 0.30-0.35 mm. wide, at the broad truncate apex coarsely three- or four-toothed, narrowly margined by two or three rows of elongated cells, involute clear to the base so as to be almost tubular, entire. Hyaline cells reënforced by numerous fibril-bands, on the inner surface of the leaf with comparatively few generally unringed medium sized pores in the cell angles, on the outer surface with hardly any spores except in the lower cell angles, but occasionally weakly ringed pseudo-pores occur in short rows along the commissures of scattered cells. Chlorophyll cells in cross-section usually trapezoidal and exposed on both sides of the leaf, with the longer of the parallel sides exposed on the outer surface, but triangular cells occur sporadically, in which case they are enclosed on the inner surface of the leaf by the strongly under-arching hyaline cells.—Massachusetts, 16 Sept., 1891, leg. Faxon.

This species may be distinguished from *Sph. cuspidatum* by the very narrowly margined branch leaves, from *Sph. angustilimbatum* by much smaller stem leaves which are not fibrillose to the base, and which have the margins broadened below, as well as by the mostly three-branched fascicles with equally divergent branches.

Friendenau, 25 Feb. 1908.

THE TYPE LOCALITY OF SPHAGNUM FAXONII.

HARLEY HARRIS BARTLETT.

The March number of *Rhodora* contains a translation from Hedwigia of the original description of *Sphagnum Faxonii* Warnst. There only the following meagre information is given as to the origin of the type specimen: "Massachusetts, 16 Sept., 1891, leg. Faxon." Warnstorff has been so kind as to send me part of his type material in order that I might match it with more accurately labeled specimens in the duplicate collection of Faxon *Sphagna* at the Harvard Cryptogamic Herbarium, and thus gain accurate knowledge as to the type locality. Search for plants collected on 16 Sept., 1891, proved successful,—enough were found to prove beyond peradventure that on that date Mr. Faxon collected at Streeter Pond in Lisbon, New Hampshire. Furthermore, on that date he collected no peat moss more closely allied to *Sphagnum cuspidatum* (the nearest affinity of *Sphagnum Faxonii* is with this species) than *Sphagnum recurvum* var. *parvifolium*. It seems necessary to conclude, therefore, that both the locality and date given in Warnstorff's article are incorrect.

An examination of all the *Sphagnum cuspidatum* and allied species in the Faxon collection showed but one number which matched the type material of *Sphagnum Faxonii* sent by Warnstorff, namely no. 1049, collected at Sunken Heath, Mt. Desert Island, Maine, 29 June, 1891, by Mr. Faxon, in company with Mr. Rand. This number agrees with the type not only in structural details, but also in those elusive characters of habit which so often give individuality to all the material of the same collection. In the

present case the identification of the Mt. Desert plant as the original source of Warnstorf's type is strongly confirmed by the presence, intermingled with both specimens, of the same hepatic, which has been determined by Prof. Evans as *Lophozia inflata* (Huds.) M. A. Howe. It may be mentioned in passing, although it must be admitted that in view of the small number of botanists who collect hepatics it is at least a doubtful argument in favor of Mt. Desert as the type locality of *Sphagnum Faxonii*, that *Lophozia inflata* has never been reported from Massachusetts.

As a check upon the accuracy of the data accompanying the specimens at the Harvard Cryptogamic Herbarium, Mr. Rand's Mt. Desert herbarium was examined, and, as expected, still more of the characteristic material of *Sphagnum Faxonii* was found, again intermingled with *Lophozia inflata*. Mr. Rand's herbarium afforded, also, two additional stations for the plant on or near Mt. Desert,—Great Marsh Heath, Sea Wall and Great Cranberry Isle. In two cases the labels gave the habitat as "shallow pools." The local use of the word "Heath" on Mt. Desert is explained in the introduction to Rand and Redfield's "Flora of Mt. Desert Island, Maine." Here will also be found citation of all the specimens now referred to *Sphagnum Faxonii*, catalogued under vars. *plumulosum*, *submersum* and *falcatum* of *Sphagnum cuspidatum*.

To determine the relationship of *Sphagnum Faxonii* with other members of the *Cuspidata*, which occur in the same region, should prove an interesting problem to the bryologists of the Josselyn Botanical Society during their annual meeting at Mt. Desert in August.

Cambridge, Mass.

LICHEN NOTES NO. 12.

The *Cladonia* Specimens of "Lichenes Boreali-Americani."

G. K. MERRILL.

An attempt is here made to assign to the *Cladonia* specimens of Miss Cummings' "Lichenes Boreali-Americani," their nomenclatural equivalents as recognized by Wainio in his *Monographia Cladoniarum*, Part III. The same inquiry is extended to those examples of the "North American Lichens" series in my possession. The greater part of the *Cladonia* material published in the two series is satisfactorily determined where one accepts Tuckerman as a guide, but the thought of the elder Fries whom Tuckerman follows in his disposition of the *Cladonias* has long been out of fashion with the European Lichenographers, and the tendency has been to make the genus more recondite than simple. One hears now and then that Wainio's Monograph is burdened with too much knowledge. The diligent and exhaustive inquirer seldom offers this criticism however, but welcomes information and puts up with the hardships of obtaining it. If it be desirable to know anything at all of the subject, it is equally so to know as much as possible, and it would certainly be no disadvantage to American Lichenology to have our *Cladonia* forms interpreted in the Wainian point of view, even as

in the fragment here offered. Criticism or revision of published exsiccatae is attended with some risk, for it is well known that exsiccati frequently furnish variable exhibits under the same number or name. There is every reason to believe that diversity of this sort may be found in both the Cummings' series, indeed it could scarcely be otherwise, determined as they were on Tuckerman's phytographical conceptions. I am able to state however, from having in my possession many of what may be called the type examples of the various *Cladonia* numbers, such being the material made use of by Miss Cummings and Mr. Williams in their examinations for and discussions of identifications, that there is marked agreement with the material published.

CLADONIA RANGIFERINA (L.) Hoffm. No. 62 L. B. A., and No. 30 N. A. L. both from Wellesley, Mass. = *Cladonia rangiferina* (L.) Web. Wainio Mon. Pt. III p. 222. The specimens characteristic, K+

CLADONIA RANGIFERINA b. SYLVATICA L. No. 63 L. B. A. Vineland, N. J., and No. 31 N. A. L. Wellesley, Mass. = *Cladonia sylvatica* (L.) Rabenh. f. *laxiuscula* Del. Wainio l. c. p. 222. K—

CLADONIA RANGIFERINA c. ALPESTRIS L. No. 64 L. B. A. Wellesley, Mass. = *Cladonia alpestris* (L.) Rabenh. Wainio Mon. Pt. I. p. 41. It is impossible for me to associate *C. alpestris* of common occurrence with any one of the modifications indicated for the species in Pt. III of the Monograph p. 223. K—

CLADONIA PAPILLARIA (Ehrh.) Hoffm. No. 59 L. B. A. Chester, S. C. = *Cladonia papillaria* (Ehrh.) Hoffm. m. *papillosa* Fr. Wainio Mon. Pt. III. p. 224. Another specimen under the same number is equivalent to f. *stipata* Flk. Clad. Comm. p. 6. K+ yellowish.

CLADONIA PAPILLARIA b. MOLARIFORMIS Hoffm. No. 247 L. B. A. Rock Creek, D. C. = *Cladonia papillaria* m. *molariformis* (Hoffm.) Schaer. Wainio l. c. p. 224.

CLADONIA DIGITATA (L.) Hoffm. No. 142 N. A. L. St. Francis, Me. = *Cladonia digitata* Schaer, f. *monstrosa* (Ach.) Wain. Wainio l. c. p. 228. The reaction is K +

CLADONIA CORNUCOPIOIDES (L.) Fr. No. 245 L. B. A. Mt. Moosilauke, Franconia Mts., N. H. = *Cladonia coccifera* (L.) Willd. v. *stemma-tina* Ach. Wainio l. c. p. 228. K+ faint yellow.

CLADONIA CORNUCOPIOIDES b. PLEUROTA Schaer. No. 306 N. A. L. "characterized by very long podetia," same locality as the foregoing, in my copy consists in part of *Cladonia coccifera stemma-tina* and (the plants with "long podetia") *C. deformis extensa*. Variation *pleurota* (Flk.) Schaer. of *C. coccifera* is sorediate, not verruculose.

CLADONIA DEFORMIS Hoffm. No. 141 N. A. L. St. Francis, Me. = *Cladonia deformis* Hoffm. m. *extensa* (Hoffm.) Wain. Wainio l. c. p. 231. K+ faint yellow.

CLADONIA CRISTATELLA Tuck, No. 67 L. B. A. Wellesley, Mass. = *Cladonia cristatella* f. *Beauvoisii* (Del.) Wain. Wainio l. c. p. 231. K—

CLADONIA LEPORINA Fr. No. 144 L. B. A. Auburn, Ala., is one of the few species remaining unmolested by lichenological reviewers.

CLADONIA UNCIALIS (L.) Web. No. 271 L. B. A. Mt. Moosilauke, N. H. = *Cladonia uncialis* f. *biuncialis* (Hoffm.) Harmand in Cat. Lich. Lorraine, p. 116. The perplexities of *C. uncialis* are in no degree cleared up by Wainio's subdivisions. In his Schema Mon. Pt. III, he ignores *C. uncialis adunca*, a long recognized form of the species, and it, with the plant illustrated by No. 271, is absolutely without place or name. Form *biuncialis* is representative of a maximum of development for the plant commonly recognized in this country as typical *C. uncialis*, and the name in the writer's estimation may best stand as a convenient designation for indicating extent of development, in the same way that *major*, *extensa*, *valida*, *grandis*, etc., find a use in other *Cladonia* species. For the less developed exhibits of that *uncialis* type to which f. *biuncialis* is referable, the designation *humilior* Fr. may well be employed. Wainio states that *Lichen uncialis* L. is equivalent to *C. uncialis* Fr. This would be the var. a. Fries Li. Eur. Ref. and it comprehends v. *adunca* Ach., *biuncialis* Hoffm. and all the minor conditions of the two. Variety b. *humilior* Fr. is now known to be one of these minor states with affinity to *biuncialis*. It thus appears that no one of the sub-forms of *C. uncialis* may be definitely established as a historical type for the species. K—

CLADONIA UNCIALIS (L.) Fr. No. 181 L. B. A. Brewster, Mass. = *C. uncialis* (L.) Web. f. *obtusata* Ach. Wainio Mon. Pt. III, p. 233. The specimen is by no means well characterized but has the dilated summits of the form.

CLADONIA BORYI Tuck. No. 65 L. B. A. Annisquam, Mass. = *C. reticulata* (Russell) Wain. f. *reticulata* (Bor.) Wain. Wainio Pt. III, p. 234. Tuckerman's name should be preserved for this plant for he was first to maintain its specific identity. No. 65 is not var. b. *lacunosa* Bory of Tuckerman's 1848 Synopsis, hence not form *lacunosa* (Bor.) Wain. of the Monograph. Rendering justice to all parties the name for the plant represented by No. 65 should stand as **C. Boryi** Tuck. f. **reticulata** (Russell) Merrill. comb. nov. K—

CLADONIA DELICATA (Ehrh.) Flk. No. 192 L. B. A. Rock Creek Park, D. C. = *C. delicata* (Ehrh.) Flk. f. *quercina* (Pers.) Wain. Wainio l. c. p. 238.

CLADONIA FURCATA (Huds.) Fr. v. *racemosa* (Hoffm.) Flk. No. 243 N. A. L. North Woodstock, N. H. = *C. furcata* (Huds.) Schrad. v. *racemosa* (Hoffm.) Flk. f. *corymbosa* (Ach.) Nyl. Wainio l. c. p. 239. While No. 243 is satisfactorily *racemosa* Flk. there is considerable doubt regarding its referableness to *racemosa* Hoffm. Wainio unites under his v. *racemosa corymbosa* all the fertile and some of the unfertile *furcata* modifications of Floerke and later authors. The f. *corymbosa* of Nylander's recognition comprehends the stout rigid moderately fissured copiously fruited *furcata* that Floerke makes a sub-variety of his v. *fissa* under the

name of *arbuscula*. No. 243 is not form *corymbosa* in any except Wainio's sense. It is not Floerke's v. *fissa* nor its sub-variety *racemosella*, and it is best disposed of under *racemosa* Flk. K—

CLADONIA SQUAMOSA Hoffm. No. 60a L. B. A. North Woodstock, N. H. and No. 60b L. B. A. Norton, Va.=*C. squamosa* (Scop.) Hoffm. f. *denticollis* (Hoffm.) Flk. Wainio l. c. p. 242. Most of the innumerable *squamosa* subdivisions of recent European proposal are as yet undetected in this country. To a great extent this is due to the indifference of our investigators rather than lack of material. K—

CLADONIA TURGIDA (Ehrh.) Hoffm. No. 182 L. B. A. North Woodstock, N. H. =*C. turgida* (Ehrh.) Hoffm. m. *stricta* Nyl. Wainio l. c. p. 245. K— or faint +

CLADONIA MITRULA Tuck. No. 56 L. B. A. Wellesley, Mass., and No. 187 of the same series Chevy Chase, Md.=*C. mitrula* Tuck. f. *imbricatula* Nyl. Wainio l. c. p. 247. K—

CLADONIA SYMPHYCARPA Fr. No. 178 L. B. A. Takoma Park, Md.=*C. subcariosa* (Nyl.) Wain. f. *evoluta* Wain. Wainio l. c. p. 247. K+ at length crimson.

CLADONIA CARIOSIA (Ach.) Spreng. No. 57 L. B. A. St. Francis, Me.=*C. cariosa* (Ach.) Spreng. f. *cribosa* (Wallr.) Wain. Wainio l. c. p. 248. In my copy only one podetia characteristic of the form. No. 28 N. A. L. Wellesley, Mass., marked by Miss Cummings as *C. cariosa* is with difficulty referable to the species. The primary thallus is not unlike that of *C. cariosa*, and the reaction is similar, but the whole habit of the podetia is much like that of *C. strepsilis* f. *glabrata* Wain. only larger. It is interesting to note here, that *C. strepsilis* has by many authors been referred to *C. cariosa*. No. 28 is distinctly atypical and irreconcilable with any described *C. cariosa* form in my copy, whatever a study of the the other material distributed under that number may demonstrate. K+

CLADONIA GRACILIS (L.) Willd.) v. *chordalis* (Flk.) Schaer. No. 272 L. B. A. and No. 140 N. A. L. Mt. Moosilauke, N. H.=*C. amaurocraea* (Flk.) Schaer.) *celotea* Ach. Wainio l. c. p. 232. The burden of error in this determination must in part rest with the late Mr. T. A. Williams. The original specimen submitted to Mr. Williams by Miss Cummings, now in my herbarium, is indorsed in the handwriting of the former, "*C. gracilis* v. *elongata* Fr. cups almost obsolete." It seems very odd that Miss Cummings should have accepted this view, for in her early New England Lichen series the same plant was issued as *C. amaurocraea*. K—

CLADONIA GRACILIS (L.) Nyl. a. *verticillata* Fr. No. 162 L. B. A. Takoma Park, Md.=*C. verticillata* Hoffm. v. *evoluta* Th. Fr. Wainio l. c. p. 258. K—

CLADONIA PYXIDATA (L.) Fr. No. 53 L. B. A. Allaguash Plantation, Me.=*C. pyxidata* (L.) Fr. v. *neglecta* (Flk.) Mass. Wainio l. c. p. 252. The

apothecia in my copy rather pale, and the podetia less verrucose than in typical *v. neglecta*, but the interior of the scyphi are strongly verrucose-corticate. K—

CLADONIA FIMBRIATA (L.) *v. radiata* (Schreb.) Coem. No. 345 N. A. L. Lake Wellington, Colo.=*C. fimbriata* (L.) Fr. f. *cornutoradiata* Coem. sub-forma *radiata* (Schreb.) Coem. Wainio l. c. p. 253, and is entirely characteristic.

CLADONIA FIMBRIATA (L.) Fr. *v. coniocraea* (Flk.) Wain. No. 268 L. B. A. Lake Wellington, Colo. In my copy the podetia are whitish and farinose sorediate throughout and not corticated basally, hence do not belong with *C. ochrochlora* Flk. of which the habit of the podetia in its *v. cerotodes* Flk. resembles that of our specimen. No. 268 on the evidence of its characters as presented in my copy, seems to be a plant uniting the features of sub-forma *subulata* (L.) Wain. with those of sub-forma *fibula* Ach. Wainio l. c. p. 253. Rockland, Maine.

OFFERINGS.

(To Society Members only. For postage.)

Mr. W. W. Calkins, Berwyn, Cook Co. Illinois. *Anomodon attenuatus* (Schreb.) Huebn.; *Sphagnum compactum* and *S. acutifolium* var. *Schimperii*. All collected Cook Co.

Dr. A. F. K. Krout, Glenolden, Delaware Co. Pa. *Jungermannia exeisa* Dicks.; *Reboulia hemispherica* Raddi. Collected near Philadelphia.

Mr. D. Lewis Dutton, R. F. D., 2 Brandon, Vermont. *Sphagnum Girgensohnu* Russ.; *S. Girgensohnu* var. *coryphaeum* Russ. Collected Vermont.

Mr. N. L. T. Nelson, 4509 a Cote Brillante Ave., St. Louis, Mo. *Cylindrothecium seductrix* Sulliv. cfr. Collected Missouri. *Climacium Americanum* Brid. cfr. Collected Colorado.

Mr. C. C. Plitt, 3933 Lowndes Ave., Baltimore, Maryland. *Leucobryum glaucum*. See article in this number.

Miss Gertrude Streater, Clark Hall, University Station, Seattle, Wash. *Tayloria serrata* B. & S. Collected Menlo Park near Steilacoon, Wash.; *Rhacomitrum canescens* var. *ericoides* B. & S. st.

Mr. George M. Pendleton, Sisson, California. *Mnium medium* B. & S.

Miss Alice C. Kendall, Holden, Mass. *Mnium cinclidioides* (Blytt.) Huebn. Collected Holden.

Mr. Edward B. Chamberlain, Cumberland Center, Maine. *Brachythecium rivulare* B. & S. cfr.; *Bryum Lapponicum* Kaur. cfr. Both collected by Dr. V. F. Brotherus, in Finland.

Miss C. C. Haynes, Highlands, New Jersey. *Anthelia rivalis* Sw. (= *Anthelia Juratzkana* Limpr.) Trevis; *Lophozia politus* Nees. Collected, Dr. V. F. Brotherus, in Lapland.

Dr. George H. Conklin, 1204 Tower Avenue, Superior, Wisconsin. *Scapania irrigua* (Nees) Dumort; *Lophozia Lyoni* (Tayl.) Steph.; *Lophozia barbula* (Schliech.) Evans. Collected Superior, Wis.



NOVEMBER 1909



THE BRYOLOGIST

AN ILLUSTRATED BIMONTHLY DEVOTED TO
NORTH AMERICAN MOSSES
HEPATICS AND LICHENS

FOUNDED IN 1898
By
ABEL JOEL GROUT, Ph.D.

EDITOR
ANNIE MORRILL SMITH

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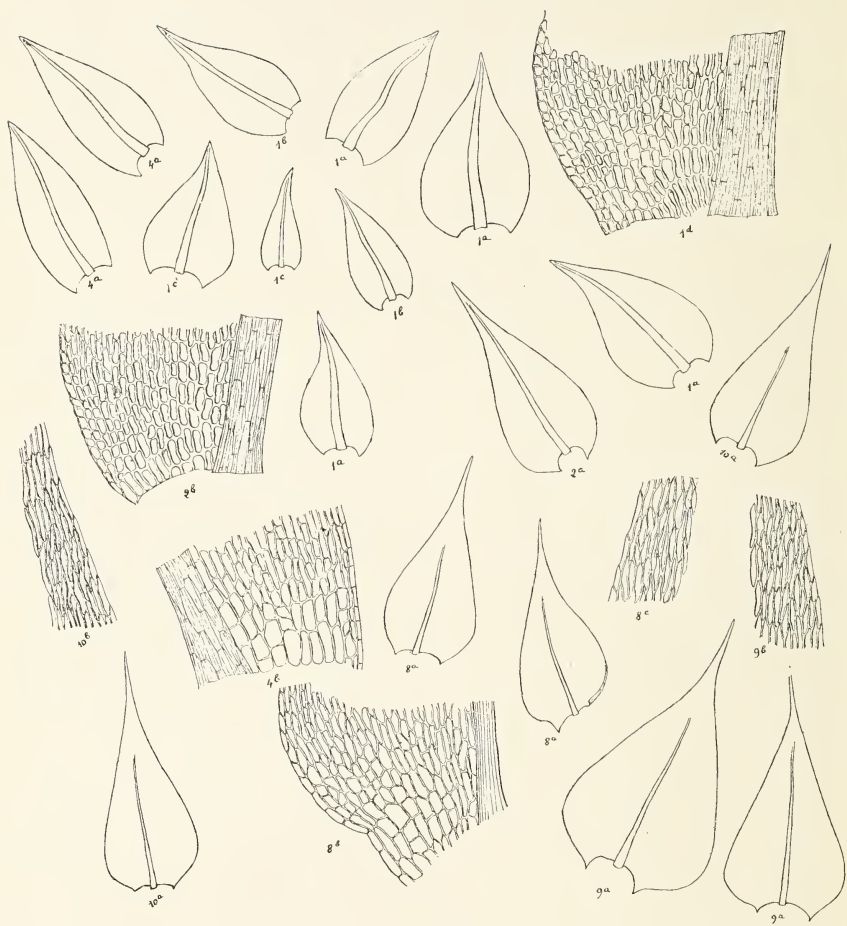


PLATE XI. Amblystegieae.

NOTES ON AMBLYSTEGIUM.

By A. J. GROUT.

The preparation of the treatment of *Amblystegium* for Part V. of my "*Mosses with Hand-Lens and Microscope*" has been a much dreaded task because of the difficulty of getting any adequate idea of the species from any published literature or from any accessible collections.

The task has proved as difficult as expected and I have seen all too numerous specimens that I cannot assign with certainty to any single species, though it is evident that each belongs to one or the other of two closely related and intergrading species.

Brotherus' treatment of the genus in "*Die Natürlichen Pflanzenfamilien*" I have found the most satisfactory of any, although following Loeske largely he fails to understand one or two of our American species, notably *Amblystegium orthocladon*.

I have found also that European authorities do not understand all the difficult and disputed forms, especially *hygrophilum*, *radicale*, *orthocladon*, and *Kochii*. Indeed the types must all be seen by one competent author to settle exactly what these species are. I have made my decisions by the best light I could obtain and I hereby return thanks to many of my European and American correspondents for the help they have so freely given in placing disputed plants. They have not always agreed but their very disagreements were helpful in explaining some of the worst puzzles.

This article is written with the idea that some of the facts discovered, and some of the opinions formed, will be helpful if expressed more at length than will be possible in the book.

It has long seemed evident that the minute ecostate species do not belong with the others. Brotherus and Loeske still retain them in the *Amblystegieae* but I believe they belong more properly in the *Hypneae*.

The remaining unicostate species can readily be divided into four groups, two of which are made genera by Brotherus.

The first subgenus, *Euamblystegium* Broth. is characterized by the short broad leaf cells, and costa slender for the genus, ending at the middle or somewhat above, percurrent in *compactum* and *Holzingeri* only. This includes *serpens* (L.) B. & S., *Juratzkanum* Schimp., *Kochii* B. & S., *compactum* (C. M.) Aust., and *Holzingerii* Grout sp. nov. Brotherus includes *varium* with *orthocladon* as a subspecies but to my mind *varium*, while intermediate between this group and the next is much more closely allied with *irriguum* than any other species, while *orthocladon* as I understand it is most pronouncedly of the latter type and closer to *irriguum* than to *varium*. He also places here *A. radicale* (P. B.) Mitt. but according to Cardot and Cheney this = *Hypnum Bergenense* Aust. which is the same as

much of the material known in Europe as *A. hygrophilum* (Jur.) Schimp. *A. hygrophilum* of Limpricht's Bry. Siles. No. 345 in Herb. Columbia Univ. = *Hypnum Bergenense* without a doubt, but Husnot's Musc. Gall. No. 939 in my collection, issued as *A. hygrophilum* is not *H. Bergenense* at all but what several American and European authors have termed *A. Kochii*. This species is not at all the *Hypnum radicale* of the L. & J. Manual, that is a form of *varium*. In my opinion *Hypnum Bergenense* is a *Campylium*, as it was in the opinion of Austin, and Limpricht's No. 345 was issued as a *Campylium*. Austin's specimens are labelled as a var. of *C. chrysophyllum* and the stem leaves are much like those of that species, broadly cordate-ovate and abruptly and longly acuminate, decurrent and subclasping at base so that the leaf *will not lie flat at base*, when removed and mounted. The alar cells are *thin-walled, hyaline* and conspicuously broader than those above. The leaves are also entire, costate to middle with median leaf cells 6-10:1, thin-walled and less chlorophyllose as a rule than in most *Amblystegia*. It differs from *Campylium chrysophyllum* in the much more distant leaves, little branched stems, more lax general habit and resemblance to the *Amblystegia* in appearance. *A. Kochii* while associated with *A. riparium* by Brotherus is apparently often confused with *Campylinm radicale*. Its leaves spread directly from the flat base and are flat throughout with shorter leaf cells having thicker walls.

A. serpens a comparatively well known and understood species grades into *A. Juratzkanum*, which appears to me at most merely a robust variety of *serpens* with larger, more spreading leaves having a less distinctly marked area of quadrate alar cells. The alar cells are more likely to be all longer than broad than in *serpens*, but this distinction does not always hold and I am inclined to think it a matter of habitat for I have found leaves with the alar cells of *A. serpens* on one side and *A. Juratzkanum* on the other.

There is a western moss with the size of *A. Juratzkanum* and alar cells of *A. serpens*, having the leaves proportionately broader and more shortly acuminate than in *serpens*. This I have not found described. It appears to be common in the Rocky Mountains, and until further light is shed on the problem I propose the name *A. serpens* var. **giganteum** var. nov. for it. Were it not for its peculiarly distinct quadrate alar cells it might be put with forms of *Kochii* into which *Juratzkanum* seems to me to grade. *Kochii* being distinguished by its larger size, laxer basal areolation and larger cells. Cheney speaks of *A. Kochii* as not common, but the form I have referred to *A. Kochii* is abundant in the East. *Amblystegium Kochii* is distinguished from small forms of *A. riparium* by its usually spreading leaves, more slenderly acuminate and sometimes serrulate and its wide short leaf cells, 3-6: 1. Small poorly developed forms of *A. varium* having the costa end below apex are sometimes confused with a *A. Kochii*, but the costa is much thicker and the leaf cells as a rule shorter and broader. *Amblystegium Kochii*, as I find it, has the leaves ovate-lanceolate and narrower than figured in the Bry. Eur. where it was originally described, also less contracted at base, but my material agrees well with authentic European material and has been identi-

fied as *Kochii* by European experts. Sometimes forms which I would refer to *Kochii* are found in collections labeled *hygrophilum*, mistakenly so I think, but the types of both need to be seen to make certain.

A. compactum is about the size of *serpens*, light green, yellowish within the dense tufts which may be 25 mm. deep but are usually thinner. Leaves erect open, about 1 mm. long, narrowly decurrent, lanceolate to ovate lanceolate, gradually long acuminate, finely denticulate throughout, teeth at base frequently recurved; "teeth formed of a single or a double papilla over the transverse wall or by the protrusion of the adjoining corners of the marginal cells." Costa percurrent or nearly so, broad but thin and sometimes almost discontinuous, frequently bearing delicate brood filaments from the back or apex; branch leaves narrower and smaller. Seta short; capsule small, erect or slightly inclined, nearly or quite symmetric. Mr. Dixon thinks *A. dissitifolium* Lindb., *A. subcompactum* Kind. and *Brachythecium densum* Milde are synonyms of this species.

Amblystegium Holzingeri sp. nov. Plants growing in rather thick wide mats, light olive green, closely allied to *Amblystegium compactum* but about twice as large, lighter colored and lacking the dense cespitose habit typical of that species; stems 2-3 cm. long, irregularly to supinnately branching, bearing numerous multiform paraphyllia; stem-leaves spreading to subsquarrose when dry; ovate-lanceolate and gradually long-acuminate, about $1 \times 0.3-0.4$ mm., somewhat narrowed to the insertion, strongly and longly decurrent, concave, with basal margins more or less reflexed, serrulate all around, costa percurrent or vanishing in the apex, stronger than in *Amblystegium compactum*; median leaf cells linear-vermicular, becoming shorter and broader toward the base, cells of basal angles subrectangular to quadrate; branch leaves smaller; minutely scabrous protonema frequent on costa of stem leaves, slender brood filaments not rare. Collected at Trempealeau Ridge, Wisconsin, June 20, 1904, by Prof. J. M. Holzinger. Type in Herb. A. J. G.; cotypes will be distributed as No. 335 of North American Musci Pleurocarpi.

The type locality is about ten miles south of Winona, on the Mississippi River. Prof. Holzinger says this locality has produced many rare things.

This species is closely related to *Amblystegium compactum* and often has the peculiar teeth at base of leaves characteristic of that species, but its larger size, lighter color, and numerous paraphyllia, combined with several minor characters, sufficiently distinguish it.

The type collection is sterile and might easily be referred to *Brachythecium*. The brood bodies are not like any figured by Correns but I have seen similar ones on *Amblystegium compactum*.

The second subgenus, *Hygroamblystegium* Loesk. (Published as a genus,) contains *A. varium* (Hedw.) Lindb., *A. fluviatile* (Sw.) B. & S., *A. irriguum* (Wils.) B. & S., *A. orthocladon* (P. B.) Kindb., *A. noterophilum* (Sulliv.) Warnst. and *A. filicinum* (L.) De Not. (Treated on p. 315 of Mosses with Hand-Lens and Microscope as a *Cratoneuron*.) With the exception of *varium* and *filicinum* this subgenus is aquatic when growing normally,

Amblystegium filicinum not infrequently grows in water, *A. varium* typically grows in wet places. The plants when aquatic are usually dark to blackish green and have a very stout percurrent costa and in some species paraphyllia are present. When aquatic the members of this subgenus are found on stones in brooks and springs. The leaf cells are typically very broad and short, 2-4:1, much longer in large forms of *A. fluviatile* and *A. irriguum* approaching respectively *A. noterophilum* and *A. irriguum* var. *spinifolium*, and in those forms themselves.

It is in this group that the greatest difficulties are met as the species vary greatly and undoubtedly intergrade. *A. fluviatile* forma *typica* Boulay is exactly illustrated by the plate (567) of the *Bryologia Europea*, except possibly that the costa usually appears stronger at the apex. The leaves are oblong to ovate-oblong, gradually narrowed to a rather blunt point; costa exceedingly stout and percurrent, nearly as wide at apex as at base; the upper leaf cells are elongated (for the group) and thick walled, in the lower 1/5 of the leaf broader and subrectangular. *A. fluviatile* forma *brevifolia* Boulay, which is more like the form figured by Cardot as the type (See fig. 4) has shorter leaves, oblong-ovate to ovate, with fewer lax cells at base and these often brown, with very thick walls, becoming opaque with age.

Through forma *brevifolia*, *fluviatile* grades into what I, in common with several authors both European and American, think to be the true *orthocladon* of Palisot (not of many other authors). In this the leaves are cordate-ovate, shortly and rather bluntly acuminate, with very short thick walled cells (2-3:1) with a few larger thick walled brown and opaque cells at the base in fully developed leaves. This I find to be not uncommon in the brooks of the East. *A. irriguum* (Wils.) B. & S. has forms which come very close to *orthocladon* but in general most of our forms have ovate-lanceolate, longly acuminate leaves with costa more tapering to the narrower apex. *Amblystegium irriguum* also has larger laxer floating forms which are to the commoner form what forma *typica* is to forma *brevifolia* in *A. fluviatile*. Such in particular are plants collected by M. Dupret "On stones in bed of a spring" Seminary of Philosophy" Montreal.

This form of *Amblystegium irriguum* approaches the var. *spinifolium* and has the large elongated cells and laxer basal areolation of that variety. In the Montreal plants, at least, paraphyllia were so numerous that at first I thought it a form of *A. filicinum*, and indeed these two species also seem to intergrade so that the inflorescence alone will decide the relationship of some forms; if indeed this is ever decisive in the *Hydnaceae*.

A. irriguum also appears to grade into *varium*, which typically is a less aquatic plant with more short cells at the marginal base of the leaf; leaves more ovate at base, more contacted to the insertion and more abruptly acuminate with a much more slender costa. The harshness and rigidity attributed to *irriguum* I have been unable to verify as a specific character, for most species of the group are harsh and more or less gritty. *A. irriguum* var. *flacidum* De Not. is an attenuate floating form with very distant and small leaves.

A. varium forma **ovata** f. nov. has smaller stem leaves which are more concave, round-ovate, abruptly and narrowly short-acuminate with nearly the outline of the leaves of *Thelia asprella*; quadrate alar cells very numerous, extending up $\frac{1}{3}$ the margin of the leaf. Type in my herbarium from near St. Louis, Mo., growing with *Eurhynchium hians* and *Mnium cuspidatum*. In a way this parallels *A. orthocladon* but differs from it in its more slender costa, more slender acumen and lack of highly colored opaque basal cells, as well as in habitat.

A. noterophilum is to *fluviatile* what var. *spinifolium* is to *irriguum*, a very large form with larger, more elongated leaf cells and strongly excurrent costa. In Europe a corresponding form of *filicinum*, *A. fallax* (Brid.) Milde, or perhaps better known as *filicinum* var. *Vallis clausae*, is found, and it is not unlikely that it may occur here also.

The third subgenus *Leptodictyum* Schimp. has been raised to the rank of a genus by Warnstorf. The species are apparently mostly derivatives of *A. riparium* (L.) B. & S., and besides this species includes *A. vacillans* Sulliv., *A. Floridanum* R. & C. and three recently described species of Cardot and Theriot, *A. brachyphyllum* and *A. brevipes* from Minnesota, *laxirete* from Missouri. As the three species are admittedly closely related to the polymorphous *A. riparium*, it is probable that most authors would regard them merely as varieties. *A. vacillans* is a rare plant with long slender stem leaves having a subobtuse apex and short apical cells. I do not believe the large specimens from Georgia and Florida that have been referred here (N. Am. Musci Pleurocarpi 269) really belong with the northern plant.

For the convenience of students I will cite corrections of my N. Am. Musc. Pl.

No. 48 issued as *Hypnum chrysophyllum* is my idea of a common form of *A. Kochii* and has so been determined by several eminent authorities. No. 243 contains the same with some *A. varium*. No. 180 issued as *A. fluviatile* I believe to be *A. orthocladon*. No. 149 issued as *irriguum* is probably the same. Cheney called it *irriguum* but Renaud (Fide Dupret) thought a similar form belonged rather to *fluviatile*.

No. 177 and No. 266 as *A. varium* appear to me to be aquatic forms of *filicinum* nearer to *irriguum* than *varium*.

No. 291 issued as *varium orthocladon* and No. 247 issued as *irriguum* are the large form of *irriguum* approaching var. *spinifolium* and certain forms of *filicinum*. No. 130 issued as *A. compactum* is in my opinion a cespitose form of *serpens*. This had been examined and named by people who ought to know and it may be mixed. My set is certainly not *compactum*.

The fourth group includes *A. Lescurii* (Sulliv.) only of our species. This is characterized by its strongly bordered leaves, but for this it would sometimes be difficult to distinguish it from *A. orthocladon*. It rightfully belongs to another genus and should be called *Sciarmonium Lescurii* (Sulliv.) Broth.

EXPLANATION OF PLATE XI.

- FIG. 1. *Hypnum orthocladon* P. B. a, Four leaves $\times 30$, from a specimen in the herbarium of Schwaegrichen from North America and communicated by Palisot. b, Two leaves $\times 30$ from a specimen in the herbarium of Schwaegrichen; collected by Muhlenberg in North America. c, Two leaves $\times 30$ from a specimen in the herbarium of Schwaegrichen; collected in Cuba by Pöppig. d, Lower portion of a leaf $\times 135$.
- FIG. 2. *Leskea varia* Hedw. from Pennsylvania (Muhlenberg). a, A leaf $\times 30$. b, Lower part of the same $\times 135$. (From an "original" specimen.)
- FIG. 4. *Hypnum fluviatile* Sw. a, Two leaves $\times 30$. b, Lower portion of one of these leaves $\times 135$. (From an "original" specimen communicated to Hedwig by Schwartz and preserved in the herbarium of the former.)
- FIG. 8. *Hypnum radicale* P. B. from North America (Palisot and Richard). a, Three leaves $\times 30$. b, Lower portion of one of these leaves $\times 135$. c, Cells from the middle portion of the same $\times 135$. (From specimens in the herbarium of Schwaegrichen.)
- FIG. 9. *Hypnum Bergenense* Austin, from Closter, New Jersey. (Austin "original" specimen.) a, Two leaves $\times 30$. b, Middle portion of one of these leaves $\times 135$.
- FIG. 10. *Amblystegium hygrophyllum* Sch. from Germany. a, Two leaves $\times 30$. b, Middle portion of one of these leaves $\times 135$.

These figures and their descriptions are taken from M. Cardot's valuable "Revision of the Types of Hedwig and Schwaegrichen" published in the "*Bulletin de l'herbier Boissier*," in 1899. The specimens marked as "original" were evidently communicated or furnished by the authors and though not types in every case certainly should be regarded as authentic. It should be remembered, however, that in those early days of inferior microscopes material was often mixed and the authors of species themselves had mixtures in their types. M. Cardot's figures have been presented as being as near authenticity as anything available. The figure *H. Bergenense* fails to show the characteristic concavity of the base as shown in Austin's *Musci Appalachianiani* No. 391.

Cheney has studied Palisot's types, and has come to somewhat different conclusions concerning several matters as noted under different species, but I personally sent specimens which I consider typical *A. orthocladon* to Cheney and he called them *A. irriguum* in most cases, although he states positively that Palisot's type is *A. fluviatile*. I hazard a guess that the specimen Cheney commented on is a form of *A. orthocladon* approaching forma *brevifolia* of *fluviatile*.

New Dorp, New York.

ADDITIONS TO THE LICHEN-FLORA OF SOUTHERN
CALIFORNIA. No. 2.

H. E. HASSE.

(First paper see BRYOLOGIST XI: 1, 1908.)

Sclerophyton Californicum (Tuck.) Hasse comb. nov.

Chiodecton Californicum Tuck. Syn. N. A. Li. Part II, 1888, p. 135.

Sclerophyton Eschw. A. Zahlbruckner "Ascolichenes" in Engler & Prantl, Die Natürl. Pflazenf. 1907, p. 105.

Thallus "pale ochroleucous," thickly crustaceous, darkening with age. Apothecia numerous, crowded, the thecial structure composed of a stroma of several apothecia surrounded by a turgid, persistent thalline margin; disk dull black but densely pruinose and so concolorous with the thallus, from round to angular, variously difform; thallus at the circumference inclining to become lobular and limited by a dull black hypothalline line; epithecium subgranulose and but little darker than the thecium; this latter is 0.140μ high, pale sordid yellow giving no reaction with iodine; paraphyses interwoven, slender; hypothecium dark brown; asci clavate, thick walled; spores in eight's, oblong ellipsoid with blunted ends, brown, 6 to 8 locular, the cells cylindric, length of spores 0.020 to 0.030μ and 0.005 to 0.007μ thick. The gonidial layer is composed of *Chroolepus*, a algae, the cells are irregularly round or oblong, forming a branching structure. Thallus with KHO no reaction, with Ca (Cl O) 2 the cortex gives a reddish, the medullary layer no reaction.

Type locality "San Diego, Dr. E. Palmer." It occurs near Newport, Orange Co., on *Lycium Californicum* Nutt., and the writer recently found it on the same host at Point Loma near San Diego, possibly Dr. Palmer's locality. Like its relatives *Rocella*, *Dendrographa* and *Dirina*, it evinces a predilection for a maritime location (A. Zahlbruckner, Bulletin Torrey Bot. Club, 27, Dec. 1900, p. 642 and O. V. Darbishire, Monographie Rocellorum, 1898, 49).

PERTUSARIA NOLENS Nyl.

Leighton Li. Flor. Gr. Brit. 3d. ed. 1879, p. 235.

A. Hue Addenda Nova, 1886, No. 834.

Crombie Brit. Lich. I. 1894, p. 508.

Thallus thin, smooth, leaden, grey or dull ashy-grey, finely rimose, areolate, no reaction with KHO or Ca (Cl O) 2, with determinate outline and a pale hypothallus; apothecia one or sometimes two in an areole, slightly elevated, minutely crateriform, roundish or mostly irregular in shape, and by the fissured thalline margin appearing stellate; disk black; thecium colorless; paraphyses slender, branched and interwoven; asci cylindric-oblong, 0.120 to 0.140μ long, 0.032 to 0.036μ thick; spores in eight's, ellipsoid, pointed or acuminate at each end, 0.032 to 0.042μ long and 0.014 to 0.022μ thick, the endospore mostly smooth or scarcely wrinkled; reaction of paraphyses with iodine yellow and only the asci blue.

On schistose rocks in Sepulveda and Rustic Cañon, Santa Monica Moun-

tains. From its similarity to *Lecanora laevata* Nyl. it is easily overlooked and so far as known, has not heretofore been reported from North America.

LECIDEA (Section *Biatora*) FUSCESCENS Sommerf.

Lecidea (Biatora) fuscescens Sommerf. Fries Li. Scand. I, 1871, p. 461.

Biatoria fuscescens (Sommerf.) Th. Fr. Tuck. Syn. II, p. 25.

Thallus crustaceous of minute, whitish or ashy grey, separate, flat scales scattered over a dark hypothallus; apothecia small, 0.3 to 0.5 mm. wide, disk dull black, when moistened dull brown, the margin thin, erect, dark ash colored or brownish black but finally disappearing and the disk then convex: epithecium subcontinuous, bluish-grey; thecium 0.048 μ high; paraphyses loosely coherent, hypothecium colorless; asci cuneate, 0.042 μ long and 0.010 μ thick; spores in eight's, colorless, simple, ovoid-ellipsoid or semi-globular, 0.006 to 0.010 μ long, and 0.004 to 0.007 μ thick; hymenial gelatine blue with iodine changing to sordid greenish-blue.

On bark of *Ribes hesprium* in cañons of Santa Monica Mts.

LECIDEA (Section *Biatora*) CADUBRIEA (Mass) Nyl.

Th. M. Fr. Li. Scand. I, 1871, p. 468.

Thallus white, thin, effuse, subgranulose; apothecia sessile, small, flat, black with a shade of red-brown, margin persistent, black; epithecium brown, granulose; thecium colorless, 0.060 μ high; paraphyses coherent, slightly capitate and brown at the tips; hypothecium colorless; asci narrowly clavate, about 0.044 μ high; spores in eight's, ellipsoid, 0.008 to 0.010 μ long, and 0.0035 to 0.0040 μ thick; hymenial gelatine blue with iodine, the globular heads of the paraphyses retaining their brown color.

On *Salix*, Topanga Cañon, Santa Monica Mts.

CATILLARIA (Section *Biatorina*) LENTICULARIS (Ach.) Th. Fr. var. VULGARIS (Korb.) Th. Fr.

Lecidea lenticularis Ach. f. *vulgaris* (Korb.) Leighton Li. Flor. Gr. Brit. 3d. ed. 1879, p. 335.

CATILLARIA (*Biatorina*) LENTICULARIS (Ach.) Th. Fr. a. VULGARIS (Korb.) Th. Fr. Th. M. Fr. Lich. Scand. I, 1871, p. 568.

Thallus crustaceous, dusky grayish-brown, thin, indeterminate, surface granular, no reaction with KHO or Ca(Cl O) 2; apothecia dull brownish-black, sessile, disk flat with a thin, slightly elevated, entire, concolorous margin, finally convex and immarginate; epithecium granulose, brownish-black; thecium colorless, 0.060 μ high, stained blue with iodine, but epithecium and hypothecium retaining their natural color; paraphyses subcoherent and finally free, with globular, dark brown heads; hypothecium brown of lighter shade than the epithecium; asci clavate; spores in eight's, bilocular, narrowly- or fusiform-ellipsoid, acuminate at both ends, 0.007 to 0.012 μ long and 0.002 to 0.004 μ thick. Medullary hyphae not stained by iodine.

On schistose rock, Santa Monica Mts.

Catillaria glauco-nigrans (Tuck.) Hasse n. comb.

Biatora glauco-nigrans Tuck. Syn. N. A. Lich. II, 1888, p. 31. Ascolichenes A. Zahlbruckner in Engler & Prantl, 1907, p. 129.

Thallus ash colored with a shade of brown, crustaceous, indistinctly sub-granulose; hypothallus obscure; apothecia closely sessile, black, minute to small, the larger plano-convex with a concolorous, persistent margin; epithecium of discrete, blackish-brown globules; thecium from 0.060 to 0.064μ high, colorless, reacting blue with iodine; paraphyses free, some of them thickened at the tips and with dark, globular heads; hypothecium brown, of lighter shade than the epithecium; asci clavate, 0.040 to 0.044μ long and 0.007 to 0.008μ thick; spores in eight's, colorless, bilocular, ellipsoid, 0.006 to 0.011μ long and 0.002 to 0.003μ thick.

On *Rhus diversiloba* T. & G. in cañons of the Santa Monica Mts. The similarity in the color of the thallus with that of the bark of the host and the minute apothecia tend to make this a very inconspicuous plant.

BACIDIA ENDOLEUCA (Nyl.) Kicix,

Lecidea milliaria Fr. var. *endoleuca* Leight. Leighton Li. Flor. Gr. Brit. 3d. edit. 1879, p. 363.

Biatora atrogrisea (Delis.) Hepp. Tuck. Syn. Li. N. A. II. 1888, p. 44.

Bacidia (Section *Eubacidia* A. Zahlbr.) *endoleuca* (Nyl.) Kicix. Ascolichenes A. Zahlbr. in Engler & Prantl, 1907, p. 136.

Thallus smooth, rimose, light greenish-greyish, indeterminate, epiphlaeoida; hypothallus indistinct; apothecia small, brown, darkening to brownish-black and from flat to convex; margin indistinct; when moist the disk is light brown to brown and appears semi-translucent. Epithecium continuous, a thin, pale, bluish-grey line that with KHO is tinted a violaceous; thecium 0.052 to 0.060μ high, with iodine it and the epithecium are stained blue then reddish brown; paraphyses loosely coherent, clavate at the apices; hypothecium yellow; asci clavate; spores in eight's, acicular straight, one end slightly thickened, indistinctly four to plurilocular, 0.028 to 0.042μ long and 0.005 to 0.003μ thick.

On *Acer macrophyllum* Pursh. in cañons of the San Gabriel Mts.

ACAROSPORA GLEBOSA Korb.

Acarospora glebosa Korb. Th. M. Fr. Lich. Scand. I, 1871, p. 214.

Acarospora glebosa Korb. Ascolichenes A. Zahlbr. in Engl. & Prantl, 1907, 153.

Thallus composed of round, reddish-brown, convex squamules not exceeding one millimeter in width, somewhat scattered or approximate and, then the squamules angular and rimose; apothecia small, punctiform, depressed, mostly single at the apex of the squamule, seldom two, or the disk is slightly enlarged and then concave, dull black with a rim of thalline margin; epithecium continuous, dark reddish brown; thecium colorless, 0.0120μ high, stained blue with iodine, particularly the hypothecium, being dark blue while the epithecium gives no reaction; paraphyses moderately stout, loosely coherent but agglutinated at the tips; hypothecium colorless; asci ventricose; the sac thickened at the top, 0.100μ long, 0.036μ thick; spores 24 in each ascus, bluntly ellipsoid, 0.011 to 0.018μ long, and 0.005 to 0.008μ thick; the *Protococcus* gonidia form a thick subcortical layer that also extends under the hypothecium throughout.

On sand stone, Santa Monica Mts. Perhaps not heretofore reported from North America.

Superficially greatly like some of our saxicolous *Heppia*.

BUELLIA RETROVERTENS Tuckerm. Syn. N. A. Li. II, 1888, p. 89.

Thallus of small, whitish, round to angular convex squamules, separate and even more or less scattered, their circumference sometimes crenulate or sublobular. Reaction of cortex with KHO yellow, Ca (Cl O) 2 gives no reaction; hypothallus black; apothecia one half to one millimeter wide, sub-immersed, becoming sessile; disk black, naked, from flat with a thin sub-crenulate, concolorous margin, becoming convex and the margin obscured; epithecium subcontinuous, dark brown; thecium colorless, with iodine blue; paraphyses coherent, clavate at the brown tips; hypothecium brown, nearly as dark as the epithecium; asci inflated clavate to subventricose; spores in eight's, bilocular, ellipsoid and oblong-ellipsoid, brown, 0.013 to 0.016 μ long, 0.006 to 0.008 μ thick.

On trap rock, Santa Monica Mts.

Sawtelle, California.

SOME RARE ABNORMALITIES IN LIVERWORTS.

W. C. COKER.

In looking over hundreds of young sporophytes from a luxuriant colony of *Aneura pinguis* at Chapel Hill, North Carolina, I found two cases where two sporophytes were enclosed in a single calyptra. A longitudinal section of one of these twin sporophytes, represented in Fig. 1., shows clearly that the calyptra is compound, originating from two fertilized archegonia standing close together. The necks of the archegonia are still plainly visible and there is a partition between the sporophytes extending from the top to about half way down. When we consider the manner in which the calyptra of *Aneura* originates the absence of a partition below is easy to understand. It is known that the venter of the archegonium contributes but slightly to the calyptra in this species, the larger part being formed by an upgrowth of the "torus" tissue on which the archegonia were borne.

The tissue which at first completely separated the young sporophytes was pierced at a certain stage by their approach to each other below. Continued growth at the base of the calyptra then elevated the partition leaving the lower parts of the sporophytes in a common cavity. It is evident, therefore, that this abnormality did not originate from a single archegonium which contained two eggs, such as I have described for *Mnium* (Bot. Gazette, Vol. 35, 1903) and Miss Bliss, for *Polytrichum* (Bot. Gazette, Vol. 36, 1903).*

*For examples of two capsules or two entire sporophytes from one archegonium in mosses, and reference to literature see Györfy in Hedwigia Vol. 46, p. 262, 1907.

For many abnormalities in the archegonia of *Mnium* see Holferty in Bot. Gaz. Vol. 37, p. 106, 1904.

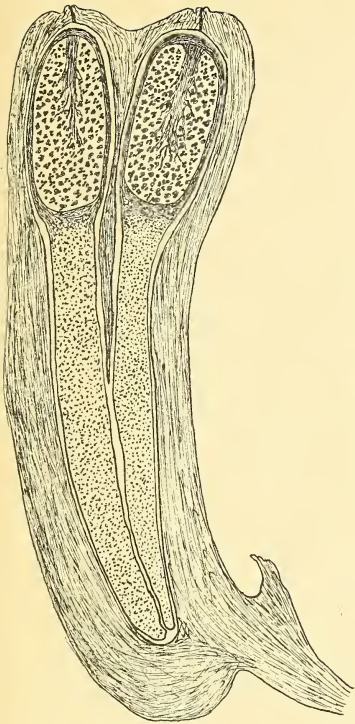


Fig. 1.

On sectioning it was seen that this archegonium contained no sporophyte and had scarcely a trace of the egg and neck cavity. Its growth seemed to be induced by a sympathetic response to the vitalizing influence of the adjoining sporophyte.

A second very unusual but entirely different case of fasciation I have met with in *Preissia quadrata*. While collecting at Ithaca, New York, a plant was found showing a double archegoniophore. A photograph of it is shown in Fig. 2. The stalk is almost exactly twice as wide as in the single archegoniophore shown in the same figure.

Univ. of North Carolina, Chapel Hill, N. C.



Fig. 2.

FIG. 1. Twin sporophyte in *Aneura pinguis* $\times 15$.

FIG. 2. Double archegoniophore in *Preissia quadrata*. Natural size.

ARCTIC MOSSES.

ELIZABETH G. BRITTON.

The American Museum of Natural History sent to the New York Botanical Garden for determination, the plants collected by Lieutenant Peary in Grant Land $81^{\circ} 40'$ in 1902, and by Dr. L. J. Wolf at Wrangle Bay, Lincoln Bay and Grant Land $82^{\circ} 27'$ in 1906.

The mosses were sent to Dr. Bryhn, a specialist on Arctic mosses who has also determined the mosses of the Amundsen Expedition of 1903-1906 and published the combined results in Christiana, Norway, under the title of *Bryophytorum Arcticorum*.*

The Peary collection included 62 bryophytes of which 57 were mosses and 5 hepatics. Of the mosses one species and two varieties were new, *Bryum Pearyanum* being dedicated to the commander of the expedition.

Some of the species are peculiar to arctic regions, all are depauperate and much mixed, and are remarkable as growing further north than those of any previous collection.

Only four of the mosses were fruiting, *Tetraplodon mnioides*, *Voitia hyperborea*, *Bryum pendulum* and *Polytrichum alpinum*. The sterile species were; *Dichodontium pellucidum*, *Dicranum spadiceum obtusum* n. var., *Ceratodon purpureus*, *Ditrichum flexicaule*, *Distichium capillarceum*, *Didymodon rubellus*, *D. alpigena*, *Tortula ruralis*, *T. norvegica*, *Encalypta commutata*, *E. rhabdocarpa*, *Pohlia nutans*, *P. commutata*, *Bryum calophyllum*, *B. Pearyanum* n. sp., *B. nitidulum*, *B. teres*, *B. cyclophyllum*, *B. obtusifolium*, *B. pallens*, *B. ventricosum*, *B. crispulum*, *Cinclidium subrotundum*, *C. hymenophyllum*, *Philonotis tomentella*, *Meesea triquetra*, *Aulacomnium palustre*, *A. turgidum*, *Timmia austriaca*, *T. norvegica*, *Myurella julacea*, *M. apiculata*, *Holmgrenia chrysea*, *H. stricta*, *Brachythecium salebrosum* var. *arcticum*, *Isopterygium pulchellum*, *Amblystegium Sprucei*, *Campylium stellatum*, *Hypnum filicinum*, *H. stramineum*, *H. giganteum*, *H. sarmentosum* var. *acuminatum*, *Drepanocladus revolvens*, *D. intermedius*, *D. brevifolius*, *D. uncinatus*, *D. polycarpus*, *D. exannulatus polaris* n. var., *D. fluitans*, *Stereodon Bambergeri*, *S. Vaucheri*, *S. revolutus*, and *S. hamulosus*.

The Hepatics were: *Arnellia fennica*, *Lophozia ventricosa*, *Cephaloziella verrucosa*, *Blepharostoma trichophyllum*, and *Diplophyllum incurvum*.

New York Botanical Garden.

*N. Bryhn: *Ad Cognitionem Bryophytorum Arcticorum*. Christiana Vid. Selsk. Forh. 1908, no. 5, pp. 13-27.

lichen NOTES No. 14.
Three New Forms of Calicium.

G. K. MERRILL.

Calicium obscurum, Merrill, sp. nov.

Thallus indistinguishable. Apothecia scattered, rather slender, averaging 0.8 mm. in height, variously directed, straight or flexuous, cylindrical, brown or brownish-black, cortex commonly opaque, but sometimes sub-shining, rather abruptly expanding into a turbinate capitulum which in the younger states is flat-topped or concave, but finally when the extrusion of the sporal mass takes place becoming somewhat convex, sporal mass umbrine or fuscous, epruinose for the most part, but sometimes grayish-suffused just below the capitulum. Spores spherical or very slightly elongated, simple, walls distinct, pale, but not hyaline, $4-6\mu$ in diameter. Two forms of algae are found, *Cystococcus*, and a cylindrical articulated form that I am unable to name.

On dead *Polypori*, trunks of decadent young pines in shaded woods. Rockland, Knox Co., Maine, Sept. 5, 1909.

The stipes arise indifferently from both surfaces of the host, but are most abundant near the extreme edge of the upper. *C. obscurum* seems referable to Nylander's subgenus *Allodium* Flora, 1880, p. 392, but this conclusion is made tentative by the presence of two algal symbionts. The *Calicium* referred to by Willey in his Enumeration of New Bedford Lichens, p. 34, as found on a *Polyporus* on Hemlock Spruce, and identified by Tuckerman as *C. trichiale* may possibly prove to be identical with the present. The plant here described may be distinguished from *C. trichiale* however, by its lack of thallus, its two forms of algae, pale spores, almost entire absence of pruina on stipes and capitulum, and the differences of stipital coloration.

Calicium minutissimum Merrill, sp. nov. sub-genus STENOCYBE.

Thallus spreading, both hypophloeous and epiphloeous, manifested to the eye as a pale determinate white-edged area of lighter color than the bark surrounding. Apothecia scattered, stipes minute, commonly less than 0.5 mm. in height, erect, usually straight, cylindrical, blackish, cortex opaque or faintly shining, rather gradually dilating into a truncated obconical capitulum, the margin inflexed and disk depressed. Spores sub-fusiform, sometimes simple, one—two—but typically three-septate, usually slightly constricted at the septa, brownish or livid-brownish, $14-30 \times 4-7\mu$. No algae were detected in either stipes or thallus. The epithallus appears to be without structure. A faint reaction noted on application of potassic hydrate.

On smooth bark of young oaks, summit of Mt. Battie, Camden, Knox Co., Maine, Aug. 22, 1909, G. K. Merrill.

From the minuteness of the stipes the plant is scarcely distinguishable except to acute vision. Allied to *C. byssaceum* Fr. but sufficiently differentiated by the determinate thallus and typically three-septate spores.

CALICIUM CURTISH Tuck. var. SPLENDIDULA Merrill, Lichenes Exsiccati No. 24, June, 1909.

Thallus variable in expansion but sometimes spreading, both hypophloeous and epiphloeous, indicated to the eye by a filmy determinate area lighter in color than the surrounding bark. Apothecia sparse and scattered, or abundant, the stipes relatively stout, averaging 0.5 mm. in height, erect, cylindrical, black, cortex smooth and shining, abruptly dilating into a turbinate or sub-globose capitulum likewise shining, the sporal mass not noticeably extruded, epruinose or rarely slightly suffused at the apex of the capitulum. Spores ellipsoid, brown, simple or indistinctly bilocular 11-15 \times 5-7 μ in linear cylindrical thekes.

On the main stems and larger branches of *Rhus typhina*, Rockland, Knox Co., Maine, May 28, 1909, G. K. Merrill, and on same substratum Ottawa, Ontario, J. Macoun.

Tuckerman in Genera p. 241 remarks that *C. Curtisii* is associable with the cluster which shall include *C. byssaceum* Fr., but the plant here described presents no characters in common with *Stenocybe*. The thallus of the present is not unlike that of *C. minutissimum* above described, but it is likewise similar to the visible thallus of many of the obscure forms of *Arthonia* and *Pyrenula* found growing on smooth barks.

Rockland, Maine.

NOTE ON AMBLYSTEGIUM NOTEROPHILUM.

(The following extract from Mr. Hill's letter will explain itself.)

I am now able to offer fruiting specimens of *Amblystegium noterophilum* (Sulliv.) Holzinger, this being the first time I have found it in fruit. I was led to anticipate the date by finding plants in August, 1908, with both archegonia and antheridia numerous and well developed. As the station is nearly forty miles from my home I could not keep in close touch with their development, but went after them when it seemed probable they would be in fruit. This, as the label shows, was June 25th, 1909. I found them fruiting freely, but should have been two weeks earlier. However they show the peristome very well, and so I offer them.

Its time of maturation as shown by this is early June. I assume that fruiting plants are quite rare; you will recall that it is the only species whose sporophyte is figured by Cheney in his article on North American Species of *Amblystegium* (Bot. Gaz. 24: 236, 1897) as he did not know of any figure of the capsule published elsewhere.

I have collected the moss in three more localities in small tributaries of the Desplains river, but they have been the submerged form. It is commonly plentiful where it grows forming tufts adhering to stones and with a habit quite like a *Fontinalis*, and may easily be taken for one at first sight. The water it frequents is commonly cold, usually in the outlet of springs or in their neighborhood, or in spring-fed streams, the water calcareous.

Several years ago I collected it at Boyne Falls, Michigan. It was there attached to logs and sticks in Boyne river, associated with *Fissidens grandifrons*. It was in an *Arbor Vitae* wood, the water cold, and abounding in

speckled trout. In one of my stations here near Lamont in the outlet of a spring and the contiguous brook, it is closely associated with *Amblystegium irriguum spinifolium*. This not unfrequently fruits in the less submerged forms. In Rock Run, about four miles west of Joliet, Illinois, is another station where it is associated with *Amblystegium riparium* or a form, or variety of it, the long stems clinging to the stones in the rapidly flowing water just like the *A. noterophilum*. But when they fruit the stems become shorter, more closely branched and less submerged. In Sugar Run, in the city of Joliet, it grows in the bed of the stream attached to the calcareous rocks over which the water flows with a rapid current, and by the margin takes a more upright form growing with *Drepanocladus aduncus*.

The plants I send grow on the nearly vertical face of a quarry in a portion not now in use. The cold water from a spring, or running out of rock crevices, passes through the tufts freely or drips from them, so that they are always wet, at least the basal part of the stems. They become encrusted with lime, almost petrified below. This makes them brittle and they may get broken in transmitting by mail. There is also considerable iron in the water, the rocks around the water's edge being stained yellow.

E. J. HILL, Chicago, Illinois.

BOSTON MEETING OF THE SULLIVANT MOSS SOCIETY.

The sixth meeting of the Sullivant Moss Society in connection with the American Association for the Advancement of Science will be held in Boston, on December 29th or 30th. The date cannot be definitely fixed till the Local Committee has arranged for the larger meetings, as we wish to avoid if possible having our session at the same hour at which they occur. This is extremely difficult to arrange, as changes are apt to be made at the last moment. However we will do our best.

At this time, therefore, only the general notice can be given, that we will hold a meeting, having a room set aside for our use for the entire day. It is planned to have a reception committee on hand all the morning and you are cordially invited to spend as much time as possible with us, getting acquainted and enjoying an informal inspection of such exhibits as are contributed for use at this time.

The formal program will begin at 2 P. M. followed by a social hour.

Postal cards giving details will be mailed as early as possible in December. In the meanwhile please do your part by planning to be present and make such contribution in the way of papers, exhibits, etc. as is possible, sending title of your intended paper, with a statement of accessories needed, lantern, black-board, etc. to Mrs. Smith, 78 Orange Street, to whom all inquiries should be addressed.

SULLIVANT MOSS SOCIETY NOTES.

It may not be generally known to the members of the Sullivan Moss Society that Miss Caroline Coventry Haynes has given to the Herbarium of the Hepatic Department a "Gift Book," with the hope that it may prove the nucleus of a future library to accompany the valuable collection of the herbarium.

The book contains Dr. Alexander W. Evans' "Bryophytes of Connecticut" (Bull. No. 11, Conn. Survey); his monograph on *Frullania* (now out of print) and his articles on *Diplophyllia apiculata*, *Fossombronina Salina* and *Lopholejeunia Muelleriana in Florida*; Dr. Marshall A. Howe's "North American Species of Porella" and Dr. L. M. Underwood's "Undescribed Hepatics from California" and Prof. John Macoun's "Catalog of Canadian Plants."

This "Gift Book" was a godsend to the writer, and will be found invaluable to the custodian, especially if located far from a university center. It has been suggested that other books could be added if those interested in the herbarium would send added copies of publications containing helpful hepatic literature. These could be bound, indexed, and rendered available not only for use by the custodian but could be loaned to members of the Society.

GEORGE H. CONKLIN, M.D.

Superior, Wisconsin.

Mr. A. LeRoy Andrews calls attention to the fact that "Carl Warnstorf has sold his collection of Sphagnum to the Berlin Botanical Museum. Herr Warnstorf is engaged upon a monograph of this genus of mosses to appear soon in Engler's Pflanzenreich."

Attention is again called to the wish of Miss C. C. Haynes regarding the use or exchange of tropical specimens of the genus *Sphaerocarpus*. See *BRYOLOGIST*, September, 1909, p. 83.

Miss Emily L. Croswell wishes to call the attention of Society members to the fact that her offering in the March number is probably *Physcomitrium turbinatum* (Michx.) Brid., instead of *Pottia truncatula* (L.) Lindb.

New members since July: No. 194. Mr. Fred. J. Lazell, Cedar Rapids, Iowa. No. 195. Miss Margaret L. Flockton, Botanical Gardens, Sydney, New South Wales. No. 196. Mr. Egidio Corti, 67 Corso Magenta, Milan, Italy. No. 197. Dr. H. S. Jewett, 15 West Monument Avenue, Dayton, Ohio.

Notice.—Professor Bruce Fink, Miami University, Oxford, Ohio, would like to correspond with lichenists regarding exchange by selection of desiderata from lists of species which could be given.

**NOTICE.—ELECTION OF SULLIVANT MOSS SOCIETY OFFICERS
FOR 1910.**

Members of the Sullivant Moss Society are requested to send ballots AT ONCE to Miss Edith A. Warner, 78 Orange Street, Brooklyn, Judge of Elections. Polls close November 30th.

For President—Prof. Bruce Fink, Miami University, Oxford, Ohio.

For Vice-President—Miss C. C. Haynes, Highlands and New York City.

For Secretary—Mr. N. L. T. Nelson, Des Moines, Iowa.

For Treasurer—Mrs. Annie Morrill Smith, Brooklyn, N. Y.

OFFERINGS FOR NOVEMBER.

(To Society Members only. — For postage.)

Rev. James Hansen, St. John's Abby, Collegeville, Minnesota. *Amblystegium varium* (Hedw.) Lindb.; *Anomodon minor* (Beauv.) Fuern.—*A. obtusifolius* B. & S. *Anomodon rostratus* (Hedw.) Schimp.

Mr. Walter Gerritson, 37 Washington Ave., Waltham, Mass. *Sphagnum Russonii* Warnst., *Sphagnum inundatum* Russ. cfr. Collected, York Beach, Maine.

Miss Caroline Coventry Haynes, Highlands, N. J., and New York. *Martinellia uliginosa* Lindb.—*Scapina uliginosa* (Sw.) Dumort. Collected by V. F. Brotherus in Lapland; *Cololejeunea Jooriana* (Aust.) Evans. Collected by Severin Rapp, in Florida.

Mr. E. J. Hill, 71 Eggleston Ave., Chicago, Illinois. *Amblystegium noterophilum* (Sulliv.) Holzinger. Collected near Chicago.

Mr. D. Lewis Dutton, R. F. D. 2, Brandon, Vermont. *Cetraria Islandica* (L.) Ach. Collected in Vermont.

Miss Mary F. Miller, Lyonhurst, R. F. D. 4, Washington, D. C. *Cladonia caespitica* (Pers.) Floerk.; *Cladonia uncialis* (L.) Web. Collected in Virginia; *Cladonia furcata fissa* Floerk. Collected by Carolyn W. Harris in New York.

Mrs. B. J. Handy, 139 Rock Street, Fall River, Mass. *Hypnum imponens* Hedw. Collected in Massachusetts.

Mr. George E. Nichols, Box 569, Yale Station, New Haven, Conn. *Neckera pennata* Hedw.; *Dicranum viride* Schimp.

Superintendent H. C. Sanborn, 11 Winthrop Street, Danvers, Mass. *Pohlia nutans* (Schreb.) Lind.; *Leucobryum glaucum* (L.) Schimp. Collected, New Hampshire.

Mr. Frank E. McDonald, 417 California Ave., Peoria, Illinois. *Funaria hygrometrica* (L.) Sibth.; *Hypnum aduncum gracilescens* B. & S.

Mrs. A. M. Smith, 78 Orange Street, Brooklyn, N. Y. *Heterodea Muelleri* (Hpe.) Nyl. Collected by Miss M. L. Flockton in New South Wales.

Notice.—Mr. R. Heber Howe, Jr., Middlesex School, Concord, Mass., wishes it known that 16 sets of his *Lichenes Novae Angliae* have been subscribe for leaving 9 sets only still on hand. Two decades have been distributed and two more are to go out early in October, with the last in November. Persons desiring to subscribe are urged to do so at once.

Notice.—Botany labels *as good as the best* and *as cheap as the cheapest*. 85 cents a thousand, postpaid. For further particulars write to D. Lewis Dutton, Brandon, Vermont.

LICHENES EXSICCATI.

Fascicle No. 1 of this publication now ready for distribution. Among the interesting plants included in the first fascicle may be mentioned: *Cetraria chlorophylla* (Humb.) Merrill; *C. arctica* (Hook.) Tuck.; *C. aculeata* (Schreb.) Fr.; *Cladonia ceratophylla* (Sw.) Spreng.; *Graphis lobata* (Eck.) Müll.; *Lacanora punicea* Ach.; *Physcia leucomelaena* var. *angustifolia* (Mont.) Müll.; *Ramalina Manni* Tuck.; *Calicium Curtisii* var. *splendidula* Merrill, var. nov.; and *Sticta limbata* var. *anomala* Merrill, var. nov. Fascicle No. 2 will be ready for distribution in September, and continuations thereafter whenever practicable. The series will contain much of interest to both students and advanced workers. The price is \$1.75 for each fascicle of 25 numbers. Subscriptions solicited.

G. K. MERRILL, Rockland, Maine.

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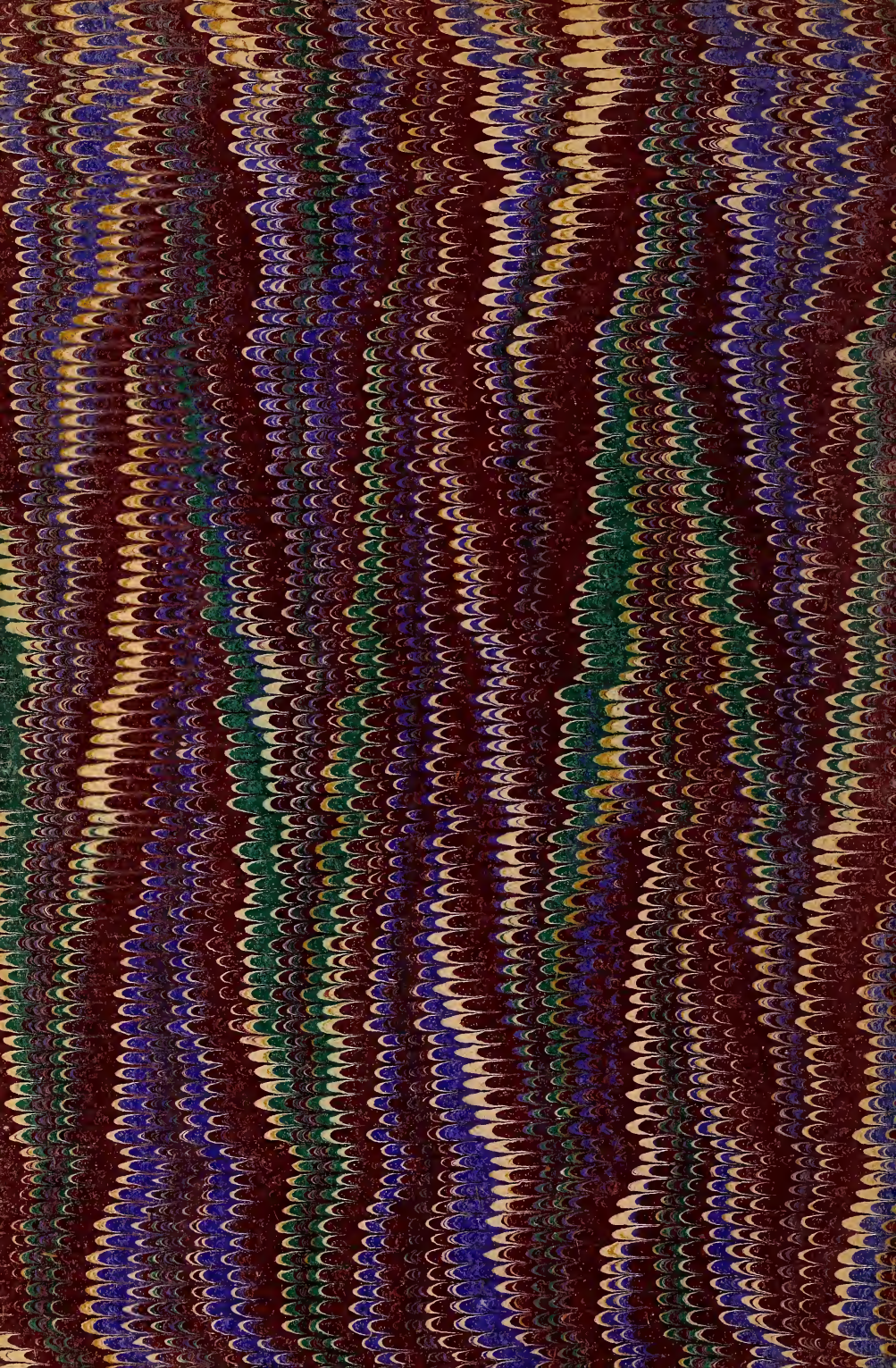
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